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Le Macdonald
Surgeon accoucheur &c

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A
S Y S T E M
O F
M I D W I F E R Y:

TRANSLATED FROM THE FRENCH

O F

B A U D E L O C Q U E,

B Y

J O H N H E A T H,

SURGEON IN THE ROYAL NAVY, AND MEMBER OF THE
CORPORATION OF SURGEONS OF LONDON.

IN THREE VOLUMES.

VOL. I.

L O N D O N:

PRINTED FOR THE AUTHOR,

And sold by J. PARKINSON, Racquet-court, Fleet-street; and
J. MURRAY, Fleet-street.

M D C C X C.





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MY motives for translating the following work, were a conviction that it contained a body of excellent doctrine, and that we had nothing in our language, like a complete treatise on the operative part of the science, though the only one which requires a very extensive knowledge.

I was also farther induced to undertake it, because in some works lately published, the powers of Nature are so magnified that a young student might be led to believe the whole art may be reduced to this single precept, *do nothing*: and that in this particular instance man is dispensed from the exercise of that reason with which the Creator has endued him; though in almost every other circumstance, the necessity of employing it,

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seems to be in proportion to the degree imparted.

We are there told that the retroversion of the *uterus*, which was so serious an accident in the time of Dr. William Hunter *, is to be esteemed a trifle of no moment; for by evacuating the urine, &c. the *uterus* will spontaneously and *certainly* recover its position. But our surprise at this assertion ceases, when we read that if a pregnant woman complain of a suppression of urine continuing for a certain time, we may be assured the *uterus* is retroverted †. Wonderful indeed may be the cures performed by Nature, if the diagnostic is to be established in that manner!

In the preface to the same work it is insinuated that when the hand is without, and the shoulder forced down to the *vulva*, assistance is not absolutely necessary, but that Nature will expel the child with the head turned on the opposite shoulder ‡. Though

* See the London Medical Essays, vol. iv. and v.

† Denman's Introduction to Midwifery, page 131.

‡ See a quotation from Everard's *Novus Exortus Hominum et Animalium*, inserted in the preface to Denman's Introduction to Midwifery, pages 35 and 36.

that may have happened more than once, where there has been a great disproportion of parts, or when the woman has had a constitution strong enough to survive the effects of the child's putrefaction, &c. yet no person acquainted with the usual relation of the child's head to the mother's *pelvis*, can think without horror, on a woman's being abandoned in such a case; in which, for one that would escape certain death, an hundred, perhaps a thousand, would inevitably perish.

And lastly, that the student may be relieved from the pain and fatigue of intense application, the author asserts, "that on the whole, a fondness for, an imperfect knowledge, and some affectation of mechanical principles, seem to have been very detrimental; as to them the frequent and unnecessary use of instruments in the practice of midwifery may in a great measure be attributed *."

I do not exactly know what may be meant by a *fondness* for mechanical principles; and it is difficult to say how far an imperfect

* Denman's Introduction, page 47.

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knowledge, or the affectation of knowledge may be detrimental ; but that a real and accurate knowledge of the parts concerned in delivery, and of the mechanism by which it is performed, is absolutely necessary to enable the operator to assist Nature when she is at a fault, is too evident to need an argument.

As to the frequent and unnecessary use of instruments, I believe nothing has contributed so much to introduce it, as the custom which prevails among most of the English teachers, of recommending to use them secretly ; for if they were not applied in that manner, no sensible man would venture to do it, without being able to give a good reason why. And that is not the only inconvenience which results from using them by stealth ; for it generally prevents the woman from being placed in a proper attitude, when they are really necessary.

It is however no more than justice, after taking notice of those extraordinary assertions of Dr. Denman, to confess that his observations on natural labour are exceedingly judicious and instructive.

That Nature is all-sufficient, always able
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to do her own work, and wants nothing but time and fair play, to enable her to overcome the greatest obstacles, is a doctrine so comfortable to the poor sufferers, and so convenient to a certain class of practitioners, that it will never want victims among the former, nor advocates among the latter. The maintainers of this doctrine are nevertheless frequently driven to inconsistency, and are obliged to assert the contrary; for on what other ground can they establish their own superiority over the most ignorant female practitioner?

I hope, by translating this work, I shall in some measure contribute to rescue the sex from the improper use of instruments by the ignorant and rash, and save them from being abandoned to chance, when they might have effectual assistance: for in my opinion, the author, without detracting from Nature, has done justice to Art.

In the execution of it, perspicuity has been my principal aim, well knowing that in a work of this kind, no ornament could compensate the want of that.

The author has favoured me with the
original

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original plates, which I believe are better executed than I could have procured at the same price in England.

I have adopted the French name, *straits*, for the openings of the *pelvis*, because I thought it more expressive than *brim*, *outlet*, *aperture*, &c. commonly used by writers on midwifery.

In considering the dimensions of the child's head, and of the diameters of the *pelvis*, it is to be remembered that the French inch is about one twelfth longer than the English; and that a line is the twelfth of an inch.

It is necessary to take notice of the difference between the French and English forceps; that difference is principally in their length, which doubtless will be a great objection to them with many, as it makes it impossible to use them without the knowledge of the bystanders; but the woman can have no greater security against their being used without absolute necessity.

That their length may be a temptation to employ more force than can be safely applied, is without any ground; for we ought
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to suppose no man would venture to use any kind of instrument without being properly instructed : but if any woman should be so unfortunate as to be committed to the hands of ignorance ; in that case, both she and her child might suffer as much injury from a pair of short forceps, as from those that are longer.

When the head is entirely in the cavity of the *pelvis*, the common short forceps may doubtless do very well ; but it is very different when the greatest bulk of the head is still above the brim : in that case, so little of the handles would be left without, that the operator could not have a perfect command of the instrument, and consequently would run a greater risk of doing mischief. On the contrary, if the French forceps were applied, the hand being placed at such a distance from the center of motion, and being secured from slipping, by the hooks which terminate the handles, would with very little force be completely master of them, and therefore more likely to conduct the head easily and safely through the canal.

When the head is retained above the *pelvis* after the exit of the *trunk*, the English
3 forceps

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forceps can enter into no competition with the French; for in that case, the longest in use among us would be of little service.

It is denied by many that the forceps can be applied on a head above the *pelvis*, doubtless for fear of their being abused; but surely that is not a sufficient reason for refusing to derive all possible advantage from them in urgent cases; for the rash and unskilful may do as much mischief when the head is low down, as when high up. In fact, nothing can be more absurd than to deny that the blades of the forceps may be safely carried wherever the hand or the fingers can be conveyed to guide them: and it is very certain that that is more easy when the head is entirely above the *pelvis*, than when it is half descended.

But however opinions may vary concerning the respective merits of the two forceps, the general principles for conducting them are equally applicable to both.

Any person desirous of seeing the French forceps, may, by applying to Mr. Pepys, surgeon's instrument maker, No. 24, in the Poultry, with whom I have left a pair for that purpose.

The

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The third part of the work, which treats of preternatural labour, may perhaps appear tedious and prolix to those who are accustomed to no other rule in all preternatural cases, than to introduce the hand and bring down the feet; but if they reflect on the great number of children who are lost in turning, or who survive it but a short time, they will believe it worth while to study how, in each particular case, the child may be brought along with the least possible violence.

In studying this part, it would be extremely useful to have the machine at hand, both to relieve the imagination in considering the various positions, and to prove that the method prescribed in each, is the most advantageous that can be employed.

It may appear surprising that so many occasions have been found of performing the Cæsarean operation in France: the reason is, they think it ought to be performed, whenever the *pelvis* is too narrow to leave a probability of the child's passing through it alive: because they believe it not allowable to give certain death to the child, to save the mother from an operation which it is

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possible she might survive. As it is rather a question of religion than science, every man will form his own judgment of it.

Some may think I might have omitted the form for baptizing the foetus *in utero*, as unnecessary in this country; but I did not undertake to abridge the work.

The chapter on the section of the *pubes* will perhaps appear to others in the same light, as it never has been, nor is likely ever to be adopted here; but as it has been attended with very important consequences, the history of it cannot be uninteresting to professional men.

My duty having obliged me to be absent from London while the work was in the press, a few more errors have crept into it than there would otherwise have been; for which I must crave the reader's indulgence.

Some of the doctrines inculcated in it, being different from some popular ones in England, I cannot expect it to please everybody; but if any find it useful, and are enabled by it to relieve one woman who would otherwise have been abandoned, my view will be accomplished. Whether I succeed,

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succeed, or not, I shall enjoy one satisfaction which no critic can rob me of, the consciousness of having employed my leisure hours with the best intention.

On board the Cumberland,

July 21st, 1790.

C O N T E N T S

O F T H E

F I R S T V O L U M E.

P A R T I.

*Of those Parts of Anatomy, Physiology, and other
Sciences, relative to Midwifery* Page 1

C H A P. I.

Of the Parts of the Woman concerned in Delivery 3

A R T I C L E I.

Of the Female Pelvis, considered with respect to
Delivery — — — — — ib.

| | | | | |
|------------|-------------------|---|---|----|
| SECT. I. | Of the Os Ilium | — | — | 5 |
| SECT. II. | Of the Os Ischium | — | — | 9 |
| SECT. III. | Of the Os Pubis | — | — | 11 |

C O N T E N T S.

| | | |
|--|-------|-----|
| SECT. IV. Of the Union of the Ilium, Ischium, and Pubes ; of the common Parts which result from that Union ; and of the natural Dimensions of the Os Innominatum in Adults | — — — | 14 |
| SECT. V. Of the Os Sacrum | — | 16 |
| SECT. VI. Of the Cocciæ | — — | 19 |
| SECT. VII. Of the Union of the Bones of the Pelvis | | 20 |
| Explanation of the First Plate | — — | 30 |
| SECT. VIII. Of the Separation of the Bones of the Pelvis in Labour | — — — | 32 |
| SECT. IX. Of the Division of the Pelvis, and of its natural Dimensions | — — — | 47 |
| Explanation of the Second Plate | — — | 53 |
| Explanation of the Third Plate | — — | 54 |
| SECT. X. Of the Deformities of the Pelvis, considered with respect to Delivery | — — | 55 |
| Explanation of the Fourth Plate | — — | 73 |
| Explanation of the Fifth Plate | — — | 74 |
| SECT. XI. Of the Soft Parts connected with the Pelvis | | 76 |
| SECT. XII. Of the Examination necessary to discover whether the Pelvis is well or ill formed | — | 86 |
| Explanation of the Sixth Plate | — — | 100 |

A R T I C L E II.

| | | |
|--|-------|-----|
| Of the Parts of the Woman concerned in Generation and Delivery | — — — | 103 |
|--|-------|-----|

| | | |
|---|-----|-----|
| SECT. I. Of the External Parts of Generation | | ib. |
| SECT. II. Of the Uterus | — — | 112 |
| SECT. III. Of the Parts dependent on the Uterus | | 120 |

C H A P. II.

| | | |
|----------------------|-----|-----|
| Of the Gravid Uterus | — — | 129 |
|----------------------|-----|-----|

C O N T E N T S.

A R T I C L E I.

Of the Changes which Pregnancy produces in the
Volume, Figure, and Structure of the Uterus 129

A R T I C L E II.

Of the Action of the Uterus — — 146

A R T I C L E III.

Of the Changes of Situation which the Uterus may
undergo during Pregnancy, and of its Obliquity
155

SECT. I. Of the Descent or Prolapsus of the Uterus, of
its Retroversion, and Anteversion — 157

SECT. II. Of the Obliquity of the Uterus — 178

C H A P. III.

Of the Menfes ; of Fecundity and Sterility ; of the
Signs of Violation, and those by which we com-
monly judge that a Woman has been lately de-
livered — — — — 203

SECT. I. Of the Menfes — — ib.

SECT. II. Of Fecundity and Sterility — 212

SECT. III. Of the Signs of Violation, and those which indi-
cate that a Woman has been lately delivered — 216

C H A P. IV.

Of Generation, Conception, and Pregnancy 222

SECT. I. Of Generation — — ib.

SECT. II. Of Conception — — 226

SECT. III. Of Pregnancy — — 228

SECT. IV. Of Touching — — 231

C O N T E N T S.

C H A P. V.

Of the Produce of Conception, or of the Substances
which constitute Pregnancy ————— 252

SECT. I. Of the Fœtus ————— ib:

SECT. II. Of the Attitude and Situation of the Fœtus in
Utero ————— 258

SECT. III. Division of the Child ————— 265

SECT. IV. Of the Secundines, or After-birth, and particu-
larly of the Placenta ————— 275

SECT. V. Of the Membranes ————— 285

SECT. VI. Of the Umbilical Cord ————— 290

Explanation of the Seventh Plate ————— 297

SECT. VII. Of the Waters of the Amnion ————— 298

SECT. VIII. Of the Manner in which the Child is nourished
during Pregnancy ————— 301

SECT. IX. Of the Circulation of the Blood in the Fœtus 308

SECT. X. Of the Changes which Labour produces in the
Circulation of the Blood reciprocally from the Mother to
the Child; and on those which depend on Respiration, as
soon as the Child is born ————— 311

P A R T II.

Of Natural Labour, and its subsequent Symptoms
321

C H A P. I.

Division of Labour, of its Causes, its Signs, &c. ib.

A R T I C L E I.

SECT. I. Of the common Determining Causes of Labour
324

SECT.

C O N T E N T S.

| | |
|--|-----|
| SECT. II. Of the natural Efficient Causes of Labour | 327 |
| SECT. III. Of the Causes accessory to the Action of the Uterus | 331 |

A R T I C L E II.

| | |
|--|-----|
| Of some of the principal Phenomena of Labour | 333 |
|--|-----|

| | |
|---|-----|
| SECT. I. Of Labour Pains | 334 |
| SECT. II. Of the Dilatation of the Neck of the Uterus | 336 |
| SECT. III. Of the Mucus, tinged with Blood, which drains from the Vagina | 338 |
| SECT. IV. Of the Gathering of the Waters | 340 |
| SECT. V. Exposition of the preceding Phenomena, and of some others, according to the Order in which they generally happen | 343 |
| SECT. VI. Of the Phenomena of the last Period of Labour | 346 |

C H A P. II.

| | |
|--|-----|
| Of Natural or Unassisted Labour, and the various Kinds of it | 352 |
|--|-----|

A R T I C L E I.

| | |
|--|-----|
| Of the First general Species of Natural Labour, or that in which the Child presents the Head | 353 |
|--|-----|

| | |
|--|-----|
| SECT. I. Distinguishing Signs of the Vertex, and of its different Positions | 354 |
| SECT. II. Of the Mechanism of Natural Labour, where the Child presents the Crown of the Head in the First Position | 357 |
| SECT. III. Of the Mechanism of Natural Labour, where the Child presents the Crown of the Head in the Second Position | 363 |

SECT.

C O N T E N T S.

| | |
|--|-----|
| SECT. IV. Of the Mechanism of Natural Labour, where the Crown of the Head presents in the Third Position | 365 |
| SECT. V. Of the Mechanism of Natural Labour, where the Crown of the Head presents in the Fourth Position | 367 |
| SECT. VI. Of the Mechanism of Natural Labour, where the Child presents the Crown of the Head in the Fifth Position | 370 |
| SECT. VII. Of the Mechanism of Natural Labour, where the Crown of the Head presents in the Sixth Position | 372 |
| SECT. VIII. Remarks on those Labours where the Child presents the Crown of the Head | 374 |

A R T I C L E II.

Of the Second general Species of Natural Labour, or that in which the Child presents the Feet 376

| | |
|---|-----|
| SECT. I. Of the Signs which indicate that the Child presents the Feet | 377 |
| SECT. II. Of the Mechanism of Natural Labour, where the Child presents the Feet in the First Position | 379 |
| SECT. III. Of the Mechanism of Natural Labour, where the Child presents the Feet in the Second Position | 383 |
| SECT. IV. Of the Mechanism of Natural Labour, where the Child presents the Feet in the Third Position | 384 |
| SECT. V. Of the Mechanism of Natural Labour, where the Child presents the Feet in the Fourth Position | 386 |
| SECT. VI. Remarks on those Labours where the Child presents the Feet | 389 |

A R T I C L E III.

Of the Third general Species of Natural Labour, or that in which the Child presents the Knees 390

A R T I C L E

CONTENTS.

ARTICLE IV.

Of the Fourth general Species of Natural Labour,
or that in which the Child presents the Breech

393

SECT. I. Of the Mechanism of Natural Labour, where the
Child presents the Breech in the First Position 395

SECT. II. Of the Mechanism of Natural Labour, where the
Child presents the Breech in the Second Position 396

SECT. III. Of the Mechanism of Natural Labour, where
the Child presents the Breech in the Third and Fourth
Positions — — — 397

CHAP. III.

Of the Management of the Woman during Labour

399

SECT. I. Of the Treatment which the State of the Woman
generally requires in the First Period of Labour 400

SECT. II. Of the Situation of the Woman during Labour
405

SECT. III. Of preparing the Parts of the Woman for De-
livery — — — 409

SECT. IV. Of quickening lingering Pains — 411

SECT. V. Of opening the Membranes — 413

SECT. VI. Of what is necessary to be done after the Mem-
branes are open — — — 416

SECT. VII. Particular Precautions relative to each Position
of the Head, or to other Circumstances which sometimes
render Natural Labour a little more difficult — 421

CHAP. IV.

Of the Management of the new-born Child 426

C O N T E N T S.

| | | |
|---|-----------|-----|
| SECT. I. Of the usual Method of treating a new-born healthy Child | — — — — — | 426 |
| SECT. II. Of the Treatment of a Child born in a Morbid State | | 432 |
| SECT. III. Sequel of the Treatment of healthy Children | | 439 |
| SECT. IV. Of the Manner of dressing new-born Children | | 440 |
| SECT. V. Of the Signs of a good Nurse | — | 450 |

INTRODUCTION.

NOTWITHSTANDING the astonishing progress which the art of midwifery has continually made since the end of the last century, and the numerous works which have appeared on the subject, I thought there still remained room for improvement, and farther assistance to those young students who propose to cultivate it. It was at the repeated solicitation of a great number of those who had attended my lectures, and who still attended them, that I undertook this work, the first edition of which appeared in 1781. I entered upon it the more willingly, because after I had well considered all the known works on the art, I found myself at a loss which to recommend to them, in order to prepare them for my lectures, or to recall to their minds afterwards, things which

are continually slipping the memory * ; because no one of them contains a complete body of doctrine on the operative part of the science, which was more particularly the object of those lectures. It would be necessary to procure them all, to possess the chain of principles which constitute the art ; and even then there would remain something to wish for. In most of them error borders so nearly upon truth, and the precepts we meet with are given with so much obscurity, that their authors seem to have written only for themselves. Add to this, that there is scarcely one of those authors perfectly consistent with himself, and whom we do not find often contradicting his own principles, and stumbling at every step ; and who does not wander from the route he has traced, or wished to trace.

The art of midwifery is nevertheless a practical art ; an art whose principles are sure, all

* This latter consideration has induced me to augment this edition considerably ; that those who have not attended my lectures and would have wished to do it, may be able to compensate what they might esteem a loss : a too extensive practice no longer permitting me, as formerly, to teach *viva voce* ; though perhaps I may yet undertake to give one course in each year.

the operations of which may be carried, in a manner, to a geometrical certainty: delivery being a mechanical operation subject to the laws of motion. It is in this point of view that I have considered it: if *Smellie* and *Levret* had not set out on the same principle, the art would have made no progress in their hands, and one of the most learned physicians of the present age would not have pronounced so favourable a judgment of it as he did about thirty years ago. “Little is wanting,” said he then, “for the art of midwifery to attain perfection, and for the operations which must be performed in the practice of that art, to be carried almost to a geometrical certainty: nor ought we,” said he, “to be surprised at it; for after all, the whole art is reducible to the following mechanical problem: *an extensible cavity, of a certain capacity, being given, to extract from it a flexible body of a given length and thickness, through an opening dilatable to a certain degree**”. This problem would have been more just, if its author had said through a bony canal, of a given form, size, and direction, and incapable of any kind of dilatation; for who

* Astruc, l'Art d'Accouch. reduit à ses Principes.

does not know that the neck of the *uterus* and the other soft parts which form what is commonly called the passage are susceptible of a very great extension? It is this point, to which *Astruc* thought the art of midwifery was arrived in his time, that I have endeavoured to attain, by collecting and fixing its principles. Though the reading of authors has been of great use to me, it will be found that *Nature* has been of much more, and that it was not till I had long studied her, that I undertook this work.

I think a work of this kind above the reach of those whom experience has not enabled to distinguish between the errors of men rendered famous by fashion and a brilliant erudition; and the fundamental truths established by others who have not enjoyed so great a reputation. This is the common fault of those works of the closet which have preceded the first step of their authors in practice, and it is by such writings as those that the doctrine of *Hippocrates* concerning this art has been perpetuated for two thousand years; though greatly inferior to that of most of the accoucheurs of the last age, and even them we quote at present with a sort of regret. To let Na-

ture

ture act when the child presents well; to bring it to that position whenever it presents differently; to open the *cranium*, dismember it in the womb of its mother and bring it away with crotchets; this is the whole sum of that doctrine which has been so many times published, and was pretty nearly the state of midwifery in the time of the celebrated *Ambrose Paré*. If that great man added not much to it, at least he awakened and excited in favour of this art, the attention and emulation of the French surgeons, to whom it was almost alone reserved to carry it to perfection.

Mauriceau is the first among them, whose writings shew that their author was really an accoucheur, and for the time, they may be compared to those of *Smellie* and *Levret*. Formed in the very bosom of practice, *Mauriceau* knew all its difficulties: if he did not find the way to surmount them all equally, it was because the art could not be the work of a single man. After him appeared *Viardel*, *Peu*, *Portal*, *Deventer*, *Amand*, *de la Motte*, and many others; lastly came *Smellie* and *Levret*. With them began the most brilliant epoch of the art of midwifery. The forceps, recently invented, but scarcely yet perfectly sketched,

having received a new form from the hands of those two celebrated men, but especially from those of *Levret*, entirely changed, as I may say, the face of the art, by causing crotchets and other instruments of that kind to be laid aside, which we were often under the melancholy necessity of employing, to extract from the womb of the mother the unfortunate child, who could not be spared but by sacrificing her. Though such instruments are still in use, a skilful man never employs them but when there remains no doubt of the child's death.

It is of no importance that people without experience cry out against the forceps, and say they have been more fatal than useful to society; though I am obliged to confess that melancholy truth, I have not a less advantageous opinion of them than all those have had, who have known how to use them with discernment and method. It was not the instrument that murdered, but the accoucheur who wanted skill to direct it properly. It is not against the rational use of the forceps that we ought to declaim, but against the abuse made of them by a crowd of practitioners who had only the name of accoucheurs. It would be with regret that I should combat here the
paradox

paradox of a physician who published, ten years ago, that the forceps ought to be banished from the practice of midwifery *, unless great advantages might result from them. A few years before he was as lavish in his praises of them, called them a *blessed instrument*, a *precious instrument*, and confessed that *humanity had derived the greatest advantages from them* †. To support his motives for proscribing them, he maintains that *Smellie* used them but ten times in the space of thirty years; that *Deventer* never used them at all; lastly, that himself has used them but twice, and that at present, having acquired more knowledge, he should not employ them in the same circumstances.

Is it therefore surprising that a man so little versed in the practice of midwifery as that physician then was, should have used the forceps but twice in the course of six or seven years, and not of twelve as he publishes? that *Deventer*, the first Latin edition of whose work was published in 1701, and the second in 1725,

* *Alph. le Roy*, Observ. & Reflexions sur l'Operation de la Symphyse & les Accouchemens Laborieux, 1780.

† *Idem*, Introduction Historique à l'Etude & à la Pratique des Accouchemens, 1776.

never used an instrument which he could not be acquainted with ; since by the avowal of the critic himself, and of many authors more faithful in their dates and relations, the forceps were not well known till 1734 and even 1735, when *Chapman* communicated them to the public? As to *Smellie*, let any one look into his collection of cases, and they will see that he used them at least five and forty times, instead of ten, and that he often regretted he had not used them more frequently. No one had more confidence in them than *Smellie*, no one rendered them of more general use nor applied them more methodically, or with greater success.

That the forceps have destroyed the lives of some children, is what nobody can deny; that many other children have been extracted with them who might have been born naturally, is equally true; but does it necessarily follow that they are a murdering or a useless instrument? At most, it could only prove that they are not always necessary; that they are not proper in all cases where the woman cannot deliver herself without help; that every one knows not how to determine the circumstances in which we ought to have recourse to them, nor
the

the way to use them ; and in one word, that there are many who exercise a profession for which Nature never designed them. If it were proved that *Smellie* never used them ten times, instead of forty-five, as it is demonstrated that *Deventer* could never have used them at all, and that the physician who proscribes them only used them twice, and in cases where he might have done without them, would those be sufficient reasons for banishing them entirely from the practice of midwifery ? How would the place of the forceps be supplied by those medical means by which that physician pretends *to bring back the art to its original simplicity, to prevent those crises dreadful to behold, and in which the art can no farther manifest itself but by violence and destruction ?* What would be the use of those frictions with warm cloths on the belly of the woman, which he so much recommends, in order to fortify *the external plane of the fibres of the uterus, whose activity must govern the internal plane, and effect the delivery ?* What, I say, would be the utility of all these means when the head is jammed in the *pelvis* ; when it is stopped at the inferior *strait*, because its dimensions exceed those of that *strait* ; in cases of violent flooding which come on at a
time

time when the head is too low to be pushed back to turn the child ; lastly, when the head, advanced to the same point, strongly compresses the umbilical cord, a loop of which more or less long hangs without ? &c. &c. Let us leave it to time, to dissipate the prejudices or the dishonesty which could dictate such a proscription.

I shall not here enter into a detail of the works which have appeared on the art of midwifery : a volume would scarcely suffice to give a catalogue of them, and what I should have to say of those most known, would far exceed the bounds of an introduction. Many have published the history of this art : but it would be difficult to distinguish him perfectly in it, who united the two first links of the chain of principles which constitute it, them who have added new ones, or who have done it with the most success. I observe in those historical essays, that praises have been often lavished on those who deserved them the least ; that the real accoucheur is not sufficiently distinguished from him who had only the name of one ; lastly, that the authors of the greater part of those essays were not what they ought to have been, to enable them to place in their
proper

proper rank, the *Mauriceaus*, the *Smellies* and the *Levrets*, and separate them from the crowd of the *Viardels*, the *Peus*, *Portals*, *Deventers*, *Amands*, and an infinite number of others, whose works are however not to be entirely rejected.

Few quotations will be found in this work. As I have not been able to dispense with some, I could have been glad to have had nothing but praises to bestow on the authors I have named: but to expose and point out their principal errors, was it not labouring more for the advantage of the art? It was necessary to preserve the minds of young students from them, who are often more attracted by the tinsel of falshood than by the truth they are in search of. I should be sorry that any one should be offended at it, and impute it to a spirit of criticism; though that is what every man who writes for the public voluntarily subjects himself to. My self-love will not be hurt if others take the pains to point out those which may have crept into this work. I shall profit in silence by the useful observations they may make, till another edition give me an opportunity of thanking the authors of them: but I shall despise all that bear the marks of ignorance,

ignorance, envy, or malice, as I have done already *.

Though numbers of men have rendered themselves useful to their fellow creatures, and have immortalized their names by their valuable writings on the art of midwifery, there has been a great number of others whose knowledge has, as I may say, been buried with them, to whom mankind would not have been less indebted, if too frequent occupations, or a premature death had not prevented them from publishing the fruits of their labour and experience. The remembrance of one of the latter will for ever perpetuate my regret, and with pleasure shall I pay to his memory the tribute of gratitude so justly due to him from me: *Solayres* is the man I mean. It is not so much the friend who esteemed me that I regret at present, as the loss of his profound knowledge of the art in question, which he

* I nevertheless thought it for my interest and the interest of humanity to take the advantage of this opportunity to repel the shafts which two critics have endeavoured to hurl against my first edition. I have dwelt particularly on those of a surgeon of *Bruxelles*, who seems rather to have written to make his name known, than to instruct: leaving it, in some measure, to time, to blunt those of *M. Alphonse le Roy*.

professed

professed among us with the greatest distinction. What I have been able to collect of his doctrine cannot diminish the magnitude of that loss; because he could not transmit to me his genius along with the knowledge he had already acquired.

Solayres left only some fragments relative to the anatomy of the *pelvis* and of the parts of the woman; what remains of him besides, is contained in a thesis, delivered by him, at his reception into the Royal College of Surgery, entitled: *Dissertatio de Partu Viribus maternis absoluto*.

This thesis is a complete treatise on natural labour, the mechanism of which had never till then been perfectly developed. It might pass for a master-piece on that part of the science, to persons less attached to the Latin diction than to the doctrine it contains. *Solayres* had maintained another in the medical schools of *Montpellier* in 1766, which much less denoted the accoucheur than the man fit to become one.

Having been the intimate friend of *Solayres* during the few years that he professed the art of midwifery, and having continued his lectures during a six months illness, of which the
first

first symptom was an almost total loss of voice; many persons, after his death, persuaded me to digest and publish what I had been able to collect of his doctrine, whether in his lectures or in our private conversations, and the few sheets he had left me. I undertook it the more willingly, because it was the first opportunity that offered of paying homage to the memory of a man who was dear to me, and because there was one who published in his name, some imperfect fragments, borrowed from different pupils: but the defects of that work, though highly applauded by *M. Raulin*, royal censor, do not permit me to make it public.

While I pay homage here to the memory of *Solayres*, I cannot avoid complaining of a young physician * who sought my friendship at a time when I was most employed in that arrangement, and to whom I granted it without reserve. My numerous affairs not permitting me to make a copy of what I was preparing, sufficiently correct for the review of the censor, I accepted the offer of his pen, and delivered him the sheets as fast as they came from mine.

* *M. Alph. le Roy*, at that time bachelor in medicine: it was in 1773.

I did not imagine that he only sought to deck himself with the spoils of the dead, or, to use his own expressions, to *extract honey from the plants which he looked on as the most venomous*; or that he would one day publish, that, *from an enthusiasm for the memory of the author*, he had digested the doctrine of *Solayres*, and made it *fit for public view, from some sketches* that I had given him.

It was not from sketches that this physician composed his work: he was nothing but a copier, and so bad a copier, on this occasion, that he did not save me the trouble of writing a third, his being no more fit for public inspection than that I had furnished him with: which I can assert with the greater confidence, because I am ready to convince any person who may doubt it, by the comparison of the three manuscripts which I still have in my hands. Nor was it any more from an enthusiasm for the memory of *Solayres* that he undertook it, but from a desire to instruct himself in an art, which till then he was entirely ignorant of, and which he nevertheless wanted to profess. I should have observed the most profound silence concerning these things, if the doctor had not provoked me, by publishing

ing that he had digested the doctrine of *Solayres* from some sketches; that the work which had cost him so much pains, and which he had engaged in with so much *enthusiasm* for the memory of the author, after having passed through divers abridgments, seemed to him to have fallen into the hands of *M. Dufot*, a physician at *Soissons*, who had given an extract of it under the protection of government*; lastly, if he had not seemed to me, by these means, to reserve himself a right to claim this also which I now publish the second time.

That no person may tax me with being a plagiarist, I repeat again that I have drawn information from all the sources that were known to me; but that I am more indebted to the lessons of *Solayres*, and more still to observation than to any other. The second part of this work, which treats particularly of natural labour, is, as I may say, nothing but a translation of the thesis already mentioned, entitled

* This catechism of sixty odd pages was nothing but an extract of a manuscript, intended for midwives, which I had intrusted to *M. Dufot*, and which he caused to be printed, without any regard to the agreement made between us. I have since retouched this work, and it was published by order of government in 1787.

Dissertatio de Partu Viribus Maternis absoluto. If any alterations are remarked in it, they are the fruit of my own experience, and of twenty years practice: the author of this thesis would have made them himself had he lived longer; for Nature alone was his master. I should have mentioned *Solayres* oftener, as well as many other authors, if the fear of distracting the attention of young students had not prevented me. The art of midwifery is not the work of one man, nor could it be; if I have collected its principles to present them with more order and precision, I do not on that account think it is more indebted to me than to others who have cultivated it; and I shall never pretend to have overturned its pillars, to erect others on their ruins. No one had more right to this pretension than *Smellie* and *Levret*, since no one extended its bounds farther: yet those two equally celebrated men confessed that they had masters. It was by the help of their works that they were enabled to surpass them: happy should I be if I could imitate them, and also trace some new path for those who shall enter on the same career after me!

General Plan of the Work.

IN order to state with more clearness and method all that concerns the surgical part of the art of midwifery, which I have distinguished from the medical part, whose object is the diseases of women and children*, I have divided this work into four parts. The first treats of those parts of anatomy and physiology essentially necessary for an accoucheur. The second treats of the mechanism of natural labour, and the delivery of the after-birth, as well as the first attentions which must be paid to the mother and child. The object of the third is preternatural labour; and of the fourth laborious, with what relates to twins, to false conception and abortion.

Plan of the First Part.

THE first chapter treats of those parts of the woman, that have any relation to delivery:

* Many authors having treated very well on this latter part, they may be consulted. I propose at some future time to publish my reflections on this subject: but I shall wait till a longer experience shall have sufficiently confirmed them.

but

but I shall consider them much less as an anatomist than as an accoucheur. This object seems to me to have been too much neglected by authors, though it contains, in some measure, the fundamental grounds of the art. Some of these parts form the canal destined for the passage of the child, and it is only by the action of the others, that it is constrained to pass through it to come into the world. But the facility or difficulty of delivery, depend much less on the force or weakness of that action, than on the proportion which the dimensions of that canal bear to those of the body which must pass it; and especially of the head. Whether delivery take place naturally, or accidental circumstances require us to terminate it, it is generally performed with little difficulty when that proportion is favourable; but it is always difficult and laborious, and sometimes impossible by the natural passage, when there is a disproportion in those same dimensions. These truths, admitted by all accoucheurs, have determined me to dwell on the part known by the name of the *pelvis*. And in order to neglect nothing that may serve to illustrate it, I have first considered it in the dry state, and

afterwards in conjunction with the soft parts which cover it on all sides.

After having considered each of the bones which form it, I examine how they are joined, and what means Nature has used to bind them together; whether their *symphyses* always relax during pregnancy, so far as to permit a separation; and if that separation be necessary for the passage of the child, as many people believe, even at this day. Afterwards I demonstrate the dimensions of this bony canal; the deformities which may affect it, their principal degrees, and the obstruction they may give to delivery; lastly, the means of ascertaining whether this part be well or ill formed, and what is the extent of its diameters in all cases. The second article of the same chapter treats of the soft parts of generation. In the second chapter I shall consider the *uterus* in the gravid state. I shall shew the changes it undergoes in its volume, in its form, in its substance also, and in its situation. There too I shall speak of its action, of its obliquity and the causes which produce it, of its signs, and its general effects, relative to delivery: if I have mentioned it in other parts of the work also,

also, it was because I could not include all which relates to it in a single section ; its effects being different according to circumstances. The section which treats of the obliquity, is preceded by one, not less important, concerning other *deplacements* known by the names of *ante-version* and *retro-version*.

The *menfes*, what relates to fecundity and sterility, as well as the signs by which we commonly judge of violation, and that a woman accused of concealment of birth, and infanticide, has really been delivered, are the subject of the third chapter.

Though in the fourth, I have stated the different systems concerning generation, it was not so much to discuss them, as merely to point them out. I shall treat more fully of pregnancy and its signs. There too I shall develop the art of touching, and demonstrate all its importance and its difficulties.

The fifth chapter treats of the produce of conception, or of the substances which constitute pregnancy. After having spoken of the rudiments of the *fœtus*, of the time when it is perfectly formed, of its size in the first two or three months of pregnancy, and of the rapidity of its development afterwards, I assign its

usual length and weight at the time of birth, and then demonstrate its attitude, and situation in the womb of its mother. Afterwards, considering it more as an accoucheur than as a naturalist, I examine the structure of its principal parts, as the head and the breast; as well as the changes those parts may undergo in their form and volume, during the passage of the child through the *pelvis*; then I establish their dimensions, and shew their relation to those of the latter. The rest of the chapter contains a description of the *placenta*, of the membranes and of the umbilical cord: of the waters which surround the *fœtus*; the manner in which it is nourished during pregnancy; the fluids which the mother transmits to it, and the circulation which is common to it with her; the changes which the efforts of labour cause in that circulation, and those which take place in the child at the moment of birth, when it begins in some measure to enjoy a new life.

Plan of the Second Part.

I BEGIN by establishing three orders of labours relatively to the mode of their termination :

tion : 1. natural labours, or those which may be performed by the sole action of the organs of the woman ; 2. preternatural labours, which require the assistance of the hand ; 3. laborious, which cannot be terminated without the help of instruments. Afterwards I shall shew what is common to them all ; and investigate the causes, whether determining or efficient, of those of the first order, as well as the phenomena which accompany them.

In order to develop the mechanism of the first order of labours with more clearness and precision, I shall divide it into four general species : 1. those in which the child presents the crown of the head ; 2. the feet ; 3. the knees ; 4. the breech : experience having frequently proved that a woman may deliver herself without help in all these cases, and that the assistance of art is not essentially necessary even in the last. Observation having also taught me that these different parts of the child did not constantly present in the same manner over the entrance of the *pelvis* ; that some of their positions were more favourable for delivery than others ; and that the child did not in all of them execute the same movements in disengaging itself (though Nature

directs them with so much wisdom that the largest diameter of the head and of the shoulders never present to the smallest diameters of the *straits* of the *pelvis*), I thought it proper to divide each of these general species of labour into several others; which I have fixed to the number of six for the first, and to four only for the other three. The reasons for it will be seen in the part of the work which I am describing.

The development of the mechanism of these different species of labour may appear superfluous, if a judgment be formed from the little use we are of in a natural labour, where our functions are almost always reduced to those of a mere spectator; but the skilful practitioner will think very differently. By reading this chapter we shall discover the fundamental principles of the art of midwifery; we shall see the greater part of its difficulties vanish; and how little is sometimes necessary to maintain Nature in her rights, or recal her to her ordinary course when she deviates from it; lastly, we shall be forced to admit that a delivery which has cost her an infinite deal of labour, as well as the person appointed to assist her, had often nothing but the shadow of difficulties

culties to encounter, and that it might have been terminated with much less trouble. All the obstacles Nature meets with are not of this kind, it is true; but the man perfectly instructed in these fundamental principles will surmount them much more easily than another.

It is by the light of these principles, that he distinguishes immediately the labour which ought to be left to Nature, from that which is within the province of art; that he discovers the cause which will render delivery difficult, laborious, or impossible without assistance: while the unenlightened practitioner only presumes it after a long time, and often not till he sees the woman ready to sink under the vain efforts she exerts to deliver herself. Uncertain what course to pursue, if he is enterprising, he makes a difficult labour of one that might have been natural; if he is timid, on the contrary, he lets slip the moment for operating: the other practitioner, sure of his principles, lets Nature act, when she is able to accomplish her purpose; he maintains her easily in the course she ought to follow, when any thing tends to disturb it, and restores her to it again, when she has deviated: if it is necessary to operate, he does it seasonably, methodically,

dically, and with a perfect knowledge of the grounds he acts on.

To throw more light on these important truths, let us suppose the woman's *pelvis* to have only three inches and a quarter in the small diameter of its entrance, and that the head of the *fœtus* presents in such a manner that its largest diameter corresponds to it; which is sometimes met with*: what would be the event of such a relation? For one woman who could deliver herself without help, and support, without being exhausted, the length of labour necessary for the expulsion of the child, ten would sink under it, or would not be delivered till after the child's death: its head not being able to suffer the reduction necessary for its passage, till softened by putrefaction, &c. If the fear of seeing the mother sink, or of losing the child, should determine us to have recourse to instruments, what a number of fruitless efforts should we not make,

* It is not very common to meet with the child's head in this position, though many authors are of opinion that the *occiput* is generally placed towards the *pubes*, and the forehead opposite the projection of the *sacrum*: but there are many women in whom the *pelvis* has only the degree of opening supposed.

if we attempted to bring down the head in the position it is in, in order to extract it? The forceps not being able to diminish it in the direction in which it exceeds the diameter of the *pelvis*, the operator would proceed to open it with the crotchet, and perhaps would congratulate himself for having compassed its extraction piece-meal. I shudder at the idea of such an enterprise, and at the consequences which might follow it to the woman.

But the skilful practitioner behaves very differently. Convinced from his knowledge of the *pelvis*, and the relation of its dimensions to those of the child's head, that delivery cannot take place in that position without great difficulty, and often not without costing the life of one of the two, he begins by turning the length of the *cranium* from the direction of the small diameter of the *strait*, inclining the *occiput* towards one of the sides, and waits securely the effect of the natural efforts. If he arrives later, and the exhausted state of the woman's strength forbids him to expect the expulsion of the child from that, he substitutes the forceps for the hand to effect the *deplacement* of the head, and extracts it with as much facility as advantage to both mother and child. Thousands of
cases

cases would add nothing to the force of these truths, so evident are they in themselves.

It is not only in such circumstances as these that we may remark that force cannot supply the place of method; a woman with the best formed *pelvis*, and a child situated in the best position at the beginning of labour, not being secure from those great difficulties I have just mentioned. Though they then arise from another cause, they do not on that account require a less extensive knowledge. The greater they seem to him who is ignorant of their cause, the more simple they appear in the eyes of him who is acquainted with their source. As the first example I have chosen, victoriously demonstrates the necessity of a perfect knowledge of the relation of the dimensions of the child's head to those of the entrance of the *pelvis*, that which I am going to mention will not less solidly establish the necessity of knowing the mechanism by which that head is expelled, the course it must take, and the various turns it must execute in its progression. Suppose it should preserve at the inferior *strait* the diagonal situation in which it traversed the superior, and cannot clear it; or that as it advanced through the superior *strait*, it has turned
on

on the child's back, as described in par. 688, and more particularly in par. 1276 and following. In the first of these cases, much more common than that which I have taken for an example over the superior *strait*, though it is not on that account any better known, not only the head cannot be expelled, unless it change its position, as it were spontaneously, but it is also impossible to extract it in many women, unless we previously effect that change. See the note on par. 1674, and the paragraph itself with the following one. The difficulties will be much greater still in the second case, when the head has descended turning on the back; because it presents a much larger diameter, as well to the space between the *ischiatric tuberosities*, as to the arch of the *pubes*, behind which the whole length and height of one of its sides is placed. Here it is neither the excessive size of the child's head, nor the narrowness of the *pelvis* that obstructs delivery; it is not because it is closely wedged in that canal that it cannot turn on its axis, to carry the *occiput* under the *pubes*, as remarked in the preceding case, but merely because it has accidentally advanced presenting nearly foremost a diameter much larger than
the

the largest of the best formed *pelvis* as well in the excavation as in the inferior *strait*; and on the other hand, because the force which tends to push it farther forward, tends also to make that diameter pass more and more horizontally: which cannot take place in any woman, except the *pelvis* be excessively large, and the child's head at the same time of the smallest size. These difficulties not only mock the expulsive forces of the natural powers, but those also which we dare employ with the forceps, &c. Yet nothing can be more simple than this case, nor any thing more easy than to restore Nature to such a situation as to enable her to expel the child; at least in most women. See par. 1283, and following. The case which I shall subjoin here, and which I relate from the testimony of two accoucheurs, long known and esteemed among us (a case which I prefer to those that have happened under my own eye)*, demonstrates the truth of these latter

* One of these latter might be attested by forty pupils who were witnesses of the fact, in some measure prepared for their instruction; since it would have been as little difficult for me to have prevented the bad situation of the child's head, as I found it to be to correct it. Several of those pupils have derived great advantages from it in their practice, and have since communicated similar observations to me.

propositions,

propositions, and might be sufficient to convince us of the superiority of the practitioner who has studied the course of Nature closely, even from his first entrance into practice, over one who, after having practised half a century, is ignorant of the mechanism of the most common labour. Towards the end of 1771, the wife of a Swiss, who had been in labour twenty-four hours, though her midwife had assured her she would be speedily delivered ever since the first pains, sent for *M. Barbaut*, who was so far misled by false appearances as to retire without proposing any thing; thinking the woman would soon be delivered without help. Ten hours more elapsed, and the head, which had descended without difficulty to the bottom of the *pelvis*, had not advanced a step farther, when *M. Destremeau* was called in. He, as well as the former, affirmed that it would soon clear the *strait*, and deceived in the same manner, after waiting several hours longer, he sent again for *M. Barbaut*, and afterwards, not being able to agree concerning the best method of delivering, one of them wishing to do it with the forceps, and the other by turning the child, they sent for *M. Solayres*. He first examined the position of the head, the tumefied scalp of which

which appeared almost at the *vulva*; he then observed for a moment the direction of the expulsive forces, and having discovered both, he declared positively that delivery was going to take place. They waited awhile, and nothing confirmed his opinion: because he had done nothing which could put the woman into a state to confirm it. This delay appeared to him necessary, not for the success which he had promised himself, but the better to convince those who had called him in, of the superiority of his principles. At the instant one of the two accoucheurs prepared himself to operate, *M. Solayres* made the woman lie on the left side to incline the *fundus* of the *uterus* that way, and change the direction of its forces*; he took the advantage of the first pains, to raise the child's forehead, which had been pushed down on the left *sacro-ischiatic* ligament†, and at the same time direct it towards the *sacrum*; delivery took place immediately, to the great astonishment of the other

* The *fundus* of the *uterus* was very much inclined to the right side.

† The head presented so that the *occiput* answered to the right *acetabulum*, and the forehead to the left *sacro-iliac* junction.

two practitioners *. What more can be desired to justify me for having minutely detailed the mechanism of an order of labours in which our office is reduced merely to that of a nurse?

In the third, fourth and fifth chapters of the second part, I treat of the aid and assistance necessary to be given to the woman during labour, as well as to the new-born child; of the delivery of the after-birth, and the management of the woman after delivery. The delivery of the after-birth especially is detailed in all the varieties of which it is susceptible; because it appears to me to be one of the most important articles of the science: without however adopting the opinion of the vulgar, and believing with them that the assistance of the accoucheur is essentially necessary in all cases, and that without his help the woman could not deliver herself of it; and because, though more simple in appearance than delivering the child, in many cases it is not less difficult

* This case was related to me by *M. Destremeau* himself, in presence of *M. Solayres*, who the same day communicated it to his pupils.

than that, and requires no less knowledge and dexterity.

Plan of the third Part.

THIS part contains every thing relative to labours of the second order, commonly called preternatural; that is to say, which require the help of art, but which the hand alone can perform. In considering the numerous causes which may require these foreign aids, and by collecting examples of the various bad positions in which the child may present at the entrance of the *pelvis*, it appeared to me that all those labours might be arranged under twenty-three general species, and that each of these might be divided into four other species: that is the order which I have observed, that I might state them more methodically.

The labours in which the child presents the feet constitute the first species; those where it presents the knees, the second; the breech, the third; the crown of the head, the fourth *; the

* These four first species of labour are not essentially pre-natural,

the face, the fifth ; the anterior part of the neck, the sixth ; the breast, the seventh ; the belly, the eighth ; the fore part of the *pelvis* and the thighs, the ninth ; the *occipital* region, the tenth ; the back of the neck, the eleventh ; the back, the twelfth ; the loins, the thirteenth ; the lateral parts of the head, the fourteenth and fifteenth ; the sides of the neck, the sixteenth and seventeenth ; the projection of the shoulders, the child's arm being engaged in the orifice of the *uterus*, and the hand without, or otherwise disposed, the eighteenth and nineteenth ; the sides of the breast, the twentieth and twenty-first ; lastly, those labours in which the child presents one of the hips, the twenty-second and the twenty-third species.

As to the particular species comprehended under each of these general ones, they are deduced from the different positions in which the aforesaid regions may present at the orifice of

natural, since the woman may be delivered without help when the child presents in either of those ways. It is only accidental circumstances which may happen during labour that sometimes renders them so.

the *uterus*: positions which I have already taken notice of respecting some of those regions.

Some will doubtless cry out against this arrangement, so little used in treatises of this kind; and others will condemn such a multiplicity of positions which *Hippocrates*, and others after him, had limited to three principal ones; *viz.* that in which the crown of the head presents, that where the feet come foremost, and that in which the child is placed across. It is in this respect especially that those who are inimical to every species of method only because they knew not how to form one, will exclaim that I have only sought to swell my details, in order to augment the volume: but why should I be disturbed at their clamours if I attain my end, to instruct; if the order I observe has procured commendations of the work, acquired it a preference over many others, and has rendered it in some measure the guide of numbers who profess the art of midwifery, not only here but in other countries where it is not less cultivated than among us? The first edition was scarcely known, before it was translated into *German*, and the translation all sold off. It will shortly be published in *England*
and

and *Holland*, an accoucheur of *London* and another of *Leyden* having requested me to furnish them with this edition in sheets as they came from the press, in order to translate it. Notwithstanding the multiplicity of species, the divisions and subdivisions I have established in this work, yet nothing will be found in it that is not already in known works: if they are not all to be found in the same, it is because the same author has not seen every thing, nor met with every thing in his own practice. By studying them all, what I have already declared would be seen, that no one of them contains a complete body of doctrine, and that I have only, as I may say, formed this of the materials which they have furnished.

As several of these species of labour have more affinity between themselves than with others, either relatively to the position of the child which constitutes them, or to the manner in which we ought to operate, after having shewn in what they differ, and what they require particular in the management of the operation, I refer for the rest to those that have been already described, in order to avoid repetitions.

M. Herbiniaux' book has drawn me into this examination, too long without doubt not to displease in an elementary work, but which many people will nevertheless think too short, on account of the importance of its object. To have made no mention of this book, in which the author has indulged himself in all sorts of personal invective against me, and against those who have most adorned the art, would have been neglecting an opportunity of justifying some of my principles, unjustly attacked, and almost all disfigured by the author. Though my pupils had a right to expect this justification from me, perhaps they will reproach me with not having been able to suppress all resentment against my critic, and with having soiled my pen by some expressions not over delicate; any other person would have found it difficult to avoid them, with *M. Herbiniaux*' book before their eyes during so long a discussion.

In the second chapter, I shall briefly examine all the causes which require the use of instruments, but particularly the forceps. Among those causes, the locked head has particularly claimed my attention; the others being already known,

known, or being such as could not be stated in this chapter, without appearing out of their place. I there enter into the detail of every thing which can cause the locked head; I indicate its signs, accidents, and method of cure relative to delivery; afterwards I shew in what a head really locked differs from one only stopped in the passage. This point had been so neglected by authors, that we scarcely find two accoucheurs at this day who have the same notions of the locked head, or who know how to distinguish that state from that which is described immediately after it in this work.

In the third chapter, after having established the general rules concerning the application of the forceps, I state those which are relative to each particular case where they may be useful. Though they are in the hands of every one who practises midwifery, I am not afraid to advance that there are very few who know how to use them seasonably and properly: thence arises the little success derived from them, the abuse daily made of them, the murders attributed to them, and the disgrace which their adversaries have endeavoured to bring them into. In this chapter, we shall see that the
manner

manner of using them is not arbitrary; that the rules for their application must be deduced from their form, and from their effects; from the relation of the dimensions of the child's head to those of the mother's *pelvis*; from the position of the head, and the course it must follow to disengage itself; lastly, from the very mechanism of natural labour. The extension I have given to this chapter has opened a new field of criticism for my detractors. Frightened at the number of articles it comprehends, they have endeavoured to inspire their pupils with the same fear, and to decry my practice, by publishing that it is excessively instrumental, and therefore excessively pernicious. I perceive with regret that my work can be of no use to them; that they are too far gone in the way they have chosen, to be brought back again: nor is it for them that I republish it. But lest they should be still farther persuaded, by seeing me insist on the plan which they have already condemned, that I am so unskilful as to multiply the occasions of using the forceps, in my practice, notwithstanding I have comprised all the cases in which they can be salutary, and have reduced their application to
rule,

rule, in one chapter, I protest that no person has recourse to them more seldom than I though no one is in greater practice; each year not presenting me a necessity of using them three times. They are however the instrument I have used most, of all those I have mentioned; I could almost say they are the only one, since I have used the lever but once*, and crotchets, comprehending the other instruments of the same species, but three or four times in nineteen or twenty years. After having shewn the means of doing without instruments, was it not necessary to describe the manner of using them when indispensable? And ought we to remain in the narrow circle within which our predecessors confined themselves, when it was our duty to extend its limits, by employing properly, as I may say, only the materials which they have left us?

The fourth chapter is much less extensive than the preceding; because the use of the

* I preferred the female branch of the forceps to the common lever: the head was in the situation mentioned at the end of par. 1685.

lever ought to be much more limited than that of the forceps: the occasions to use it being a great deal less frequent. I had besides included almost all I had to say of this instrument, in the second article of the first chapter.

The fifth contains a copious detail of the causes which require the application of cutting instruments to the body of the child, and without which it could not be extracted from the womb of its mother. I indicate the cases where the crotchets merit the preference over the others; those where it is proper to open the *cranium*, the breast or the abdomen, and in some measure dismember the child: but I endeavour throughout to inspire more horror for these operations than confidence in them. After the avowal I have made in giving the sketch of the third chapter, it will be easily believed that the cases mentioned in the fifth must be extremely rare.

The sixth chapter contains every thing relative to labours which cannot be terminated without the aid of another kind of cutting instruments, which affect only the parts of the woman. I there state under three heads all
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the causes which require the use of those instruments. Under the first head, are comprehended, the deformities and diseases of the soft parts which form what is commonly called the passage; under the second, the deformities of the *pelvis*, and under the third, *extra-uterine* conceptions, with every thing relative to the rupture of the *uterus*. I point out the operations which these different cases require, and summarily describe the manner of performing those which appertain more particularly to our art; such as the Cæsarean operation, &c. That operation, and the section of the *pubes*, comprehend two very extensive articles. The latter especially seemed to me to merit the closest and most serious attention; not because I thought it more recommendable than the other, but because it had lately excited a sort of enthusiasm, bordering on a delirium, and because many students, and even old practitioners, know not yet what judgment to form of it. To what my first edition contained on this point, I have added all the cases I have been able to collect, with reflections on most of them, which will not be destitute of utility to those who will read them without prejudice. Lastly, to throw
more

more light on what concerns this operation, the necessity and product of which cannot be determined without the rule and compasses, I have caused two plates to be engraved, which may be referred to for the more perfect understanding of the text; and a third which represents the section performed by *M. Alphonse le Roy*, on the woman mentioned in par. 2061, and following, and that which had been performed by *M. de Matthiis*, a few days before, on the woman who is the subject of par. 2085.

As plates are allowed to facilitate the study of certain arts, I thought they would not be less useful with respect to ours. I have limited myself to a very small number, lest the price of the work should exceed the ability of the greater part of the students for whom it is intended. Among those which might throw some light on the text, I have chosen the most important. Seventeen will be found in the work, *viz.* seven in the first volume, and ten at the end of the last. Of the former, six relate to the *pelvis*, and the seventh represents a knot on the umbilical cord, such a one as perhaps had not been seen before. Of the other ten, six relate to the application of the forceps;

one only to that of the lever, and the rest to the section of the *pubes*. They were all designed by *M. Chailly*, then a pupil in the Academy of Painting, and now Royal Professor of Designing in the Marine College at *Vannes*; and almost all first engraved by *M. Avril*, well known for the beauty and exactness of his works. I confess that plates can but very imperfectly supply the place of those machines which we use in a course of midwifery, and on which we demonstrate, and make our pupils execute all the operations relative to that art; except some few, which can only be demonstrated on the dead body, and even on that of a pregnant woman.

A
S Y S T E M
O F
M I D W I F E R Y

P A R T I.

*Of those Parts of Anatomy, Physiology, and other
Sciences, relative to Midwifery.*

1. **M**IDWIFERY is the art of facilitating the exit of the child, and all its appurtenances, from the womb of its mother.

2. This operation, which is entirely mechanical, and subject to the laws of motion, is most frequently performed by the natural force of the organs of the woman; but no other function of the animal œconomy requires the concurrence of so many powers, or is so laborious and painful. The facility of its execution always depends on the union of many causes; and the failure of any one of them may render it difficult, often dangerous to both mother and child, and even impossible without assistance.

3. If the office of the accoucheur is in some measure reduced to that of a mere spectator, in those cases where this function is performed according to the intentions of Nature, there are others in which his assistance is absolutely necessary. Sometimes it is proper to moderate the action of the natural powers, which would expel the child too suddenly; sometimes to augment that action, or supply the want of it; to weaken the resistance of the parts which form the passage, to render it pervious to the child; or to open it another issue, &c. But what a fund of knowledge is necessary to enable us to distinguish between the boundaries of Art and Nature! to know when to let that provident mother act, or to assist her seasonably! We ought to be acquainted, in every possible respect, with the parts of the woman concerned in delivery; the mechanism of that important function, the manner in which it is performed, the requisite conditions for it, the causes which may render it difficult, or obstruct it; and the indications which each of them prescribes. If some parts of this knowledge may be acquired by study and meditation, there are others which can only be the fruit of practice.

C H A P. I.

Of the Parts of the Woman concerned in Delivery.

4. **A**MONG the great number of parts concerned in delivery, some serve to expel the child, and others merely form the canal destined for its passage; which permits us to divide them into active and passive. The former comprehends the *uterus*, the abdominal muscles, &c.; the latter, the *pelvis*, and the soft parts which cover it, both within and without.

A R T I C L E I.

Of the Female Pelvis, considered with respect to Delivery.

5. **T**HE *pelvis*, considered without the soft parts which cover it on all sides, is a kind of irregular bony cavity, situated below the spine, of which it forms the basis, and above the inferior extremities with which it is articulated.

The facility of delivery always depends on the more or less favourable proportion which the dimensions of the *pelvis* bear to those of the child's head, and from thence arise the greatest obstacles to oppose it.

6. The *pelvis* in an adult is formed but of four bones; viz. the *ossa ilia* or *innominata*, which constitute the sides and the fore part; the *sacrum* and *coccix*, which form the back part: but we observe a greater number in the *fœtus*, and in infancy; each *os ilium* being then composed of three parts — the *ilium* (properly so called), the *ischium*, and the *pubes*; the *sacrum* of five, called false *vertebræ*; and the *coccix* of three, as it likewise is in the adult.

7. Most of these bony pieces are soft and flexible in the *fœtus*, some of them being still in a manner cartilaginous; and the edges of the others are found incrusted with a similar substance. 'Tis some time before they acquire that solidity which constitutes the essence of bone. This disposition is not peculiar to the bones of the *pelvis*, at the time of birth, when the man, if I may be allowed the expression, is no more than sketched; for Nature follows the same course in the developement of all the parts which are to form the frame of the edifice. Those who
have

have thought they discovered dispositions favourable to delivery, in the multiplicity of bones which form the *pelvis* of the *fœtus*, in the manner of their connection, and in the little solidity which results from the whole, and who have advanced that those bones undergo the same changes of figure in the course of labour as those of the *cranium*, have deceived themselves; and we may be assured that their opinion is as little consonant to reason as to experience*.

S E C T I O N I.

Of the Os Ilium.

8. THE *os ilium* is the largest of the three pieces which compose the *os innominatum* in the *fœtus*; it is placed at the side of the *pelvis*, and is commonly called the hip bone. Its form is nearly

* “ In the *fœtus*, says a modern accoucheur, the *pelvis* is “ soft and flexible, which facilitates the different attitudes it “ takes in the *uterus*, and favours delivery by the breech, and “ feet: in both cases, the pieces of which it is composed “ perform by their flexibility what the bones of the head do “ in a natural birth.” M. De Leurie, nouv. ed. § 8.

triangular; we observe two faces in it, one of which forms part of the inside of the *pelvis*, the other the outside; three edges, *viz.* the superior, the anterior, and the posterior; as well as three angles.

9. A kind of angle, or line, pretty sharp in the posterior two-thirds of its extent, and a little rounded in the rest of its length, cuts the internal face of the *ilium* a little obliquely, from above downwards, and from behind forwards, and divides it into two parts. The superior, which is larger, and a little concave, forms the *iliac fossa*: the other, which is inferior, presents behind a sort of tuberosity, to which is attached a great number of tendinous and ligamentous fibres; and a little forwarder a cartilaginous articular impression, which has some resemblance to a crescent. The rest of the internal face of the *ilium* makes part of the brim and cavity of the *pelvis*, and describes a very small portion of a circle.

10. The external face of the *ilium*, more irregular still than the internal, is so little important to the accoucheur, that I shall dispense with describing it. It is covered by the *glutei* muscles which are attached to it.

11. The superior edge of the *ilium*, which is

called the *crista*, is turned nearly like the italic *S*. It is cartilaginous in infancy ; of an irregular thickness in the adult ; and about seven or eight inches long in a woman of the middle size. It is divided into two lips, and an interstice, to determine more exactly the insertions of certain muscles, which will be mentioned in the sequel. The internal lip forms a kind of angle more or less obtuse, at about the posterior third of its length, where is inserted a ligament, attached at the other end to the transverse *apophysis* of the last *vertebra*. See § 42.

12. The anterior edge of the *ilium* is much shorter than the superior. An *apophysis* which rises in the middle of it, and which anatomists call the anterior inferior spine of the *ilium*, makes two superficial notches, one of which only gives passage to a few nervous cords, but the other serves as a pulley to the tendons of the *psoas* and *iliacus* muscles. The meeting of the anterior with the superior edge forms almost a right angle, which is called the anterior superior spine of the *ilium*, to distinguish it from the other *apophysis* mentioned above. They serve for the insertion of several muscles.

13. We see nearly the same disposition in the posterior edge of the *ilium* ; a bony projection

makes two notches in it, of which the largest only forms the summit of one more considerable, placed at the side of the *pelvis*, and a little backward, called the *sacro-ischiatic* notch. The union of this edge with the superior forms another angle, called the posterior superior spine of the *ilium*.

14. The meeting of the anterior edge of the *ilium* with the posterior, forms an angle much thicker, and more obtuse, than the preceding; on which account some anatomists have regarded it as the basis of this bone. We observe three cartilaginous impressions in it, which have no resemblance to each other. One, pretty large, a little concave, and whose superior edge describes a kind of crescent, forms nearly a third of the *acetabulum*, which receives the head of the *os femoris*; and 'tis by the two others that the *ilium* is united, and as it were foldered, to the *ischium* and *pubes*, as will be seen in the sequel. The cartilage which covers the acetabular portion is extremely thin, very smooth, and continually moistened during life by a mucous liquor, known by the name of *synovia*. Those which cover the other two *facettes* are of a different nature: similar to the cartilage which every where unites *epiphyses* to the bodies of bones, they

they are only found in infancy; and insensibly change into bone, in proportion as the subject advances towards adult age.

S E C T I O N II.

Of the Os Ischium.

15. THE *os ischium* is situated almost perpendicularly under the *ilium*. As its irregular figure renders the division of it in some sort arbitrary, I shall distinguish three parts in it, of which one forms the body, and the others the extremities.

16. The first is triangular: one of its faces regards the inside of the *pelvis*; the second, the outside; and it is on the third, called the *tuberosity* of the *ischium*, that the body rests when we sit. Of the angles of the body of the *ischium*, two form the edges of the *tuberosity*, internally and externally, and which anatomists call the lips of the *tuberosity*; the other is of a femilunar form, and makes part of the *foramen ovale*.

17. A long *apophysis*, a little flattened, pretty broad at its origin, and narrower at its extremity,

mity, terminates the *os ischium* forwards, and is considered as the branch of it. One of the edges of this *apophysis* contributes to the formation of the *foramen ovale*; and the other to that of the arch of the *pubes*, or the great notch at the fore part of the *pelvis*. Its point is joined to a similar production of the *os pubis*, by means of a cartilage which always ossifies before the age of puberty.

18. The posterior extremity of the *os ischium*, more voluminous than its body, presents a sort of irregular mass, on which however we may distinguish five faces of an unequal breadth; with a much greater number of edges and angles, which I shall not undertake to describe. Of these faces, three are cartilaginous, and destined to the same uses as those on the inferior angle of the *ilium*; that is to say, one of them makes part of the *acetabulum*, and the two others serve for the union of the *ischium* with the *pubes* and *ilium*; the fourth regards the inside of the *pelvis*, and the fifth the outside. This last seems to send out an *apophysis* backward, and a little obliquely downward, pretty sharp, and of the length of five or six lines*, which is called the ischiatic spine.

* A line is the twelfth of an inch.

SECTION III.

Of the Os Pubis.

19. THE *os pubis*, commonly called the share bone, with its fellow, forms the anterior part of the *pelvis*: the body of this bone is almost triangular in the middle, flattened towards the place of its union with that of the other side, and pretty thick at the other extremity which makes part of the *acetabulum*.

20. The superior face of the *os pubis*, broad behind, narrow before, and a little concave between its extremities, serves for a channel to the crural vessels at their exit from the *abdomen*. The internal and external faces present some little difference; they are broad before, and narrow towards the acetabular extremity. The superior and internal angle of the body of the *os pubis* is sharp, and makes part of the brim of the *pelvis*. The external angle is rounded, and the inferior femilunar; this last forms a portion of the *foramen ovale*.

21. The large extremity of the *os pubis*, which I shall call acetabular, presents two little faces
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somewhat lengthened, by which it is united to the *ilium* and *ischium*, by means of a cartilage which ossifies insensibly, and in time totally disappears. We remark also at this extremity another *facette*, much more extensive, a little concave, and covered with a layer of cartilage extremely thin, by which the *os pubis* concurs with the *ilium* and *ischium* to form the *acetabulum*.

22. The anterior extremity of the *os pubis* presents a cartilaginous and ligamentous impression, fifteen or eighteen lines long, and about six in breadth, which serves for the union of this bone with its fellow. The direction of this articular impression is almost vertical when the *pelvis* rests on the tuberosities of the *ischia* and the point of the *coccix*; but its inferior extremity is more or less inclined backward when the subject is standing. The middle of its internal edge only is covered with a very smooth cartilage, as are all the extremities of bones joined by a moveable articulation.

23. This *ligamento-cartilaginous* impression, and the superior face of the body of the *os pubis*, form at their union almost a right angle, which is called the angle of the *pubes*. Above, and a little on one side of this angle, appears a kind of tuberosity, sometimes even a sort of spine,
more

more or less salient, which serves for the insertion of the *rectus* muscle, as well as the pyramidal, and the external and inferior portion of the abdominal ring.

24. A production about seven or eight lines in length, pretty broad and flat superiorly, but narrower at its point, descends from the anterior extremity of the body of the *os pubis*, and passes commonly for the branch of that bone. It is, as it were, twisted from the inside of the *pelvis* outwards, in such a manner that one of its edges is almost anterior, and the other posterior: the posterior makes part of the *foramen ovale*; the anterior, part of the arch of the *pubes*.

25. The branch of the *pubes* does not descend perpendicularly to the horizon; it constantly inclines towards the *foramen ovale*, and much more in women than in men: which renders the arch of the *pubes* much wider in them at its upper part, and favours delivery as much as a contrary disposition would obstruct it.

SECTION IV.

Of the Union of the Ilium, Ischium, and Pubes; of the common Parts which result from that Union; and of the natural Dimensions of the Os Innominatum in Adults.

26. THESE three bony pieces, destined to form but one after infancy, are united in that early age by a pretty thick cartilage, but of a different nature from those which form part of the *sacro-iliac symphyses*, and that of the *pubes*: for it is in their nature to ossify, which they always do; whereas the latter never do but by accident, and that is exceedingly rare. This junction of the *ilium*, *ischium*, and *pubes*, is made near the middle of the *acetabulum*, and always with so much regularity, that after some time it can scarcely be distinguished; unless it be above the cavity, where we see a line more or less salient, which anatomists call *linea ilio-pectinea*, because it is formed by the union of the *ilium* and *pubes*.

27. It often happens, in children affected by the rickets before the age in which this consolidation

dation is perfect, that the three pieces which form the *acetabulum* are pushed inwards by the head of the *femur*, which narrows the entrance of the *pelvis*, and renders it so irregular as often afterwards to cause the greatest obstacles to delivery.

28. The junction of the branch of the *pubes* with that of the *os ischium*, is likewise made by a cartilage which ossifies after some years. By the connection of these two bones, is formed that great oval aperture which we see on each side of the fore part of the *pelvis*, as well as the notch in the interior edge of the *acetabulum*.

29. The *os innominatum*, in a woman of the ordinary size, is about six inches broad, from the anterior superior spine to the posterior superior. Its height is nearly six inches and a half, taken from the anterior spine to the bottom of the tuberosity of the *ischium*; and an inch more, if taken from the middle of the *crista* of the *ilium*. The knowledge of this height may serve to determine the depth of the cavity of the *pelvis* laterally, from the superior to the inferior strait.

S E C T I O N V.

Of the Os Sacrum.

30. THE *sacrum* represents a kind of inverted pyramid, flattened, and a little bent inwards. We are to consider in it, the base, the point, the faces, and edges.

31. The base of the *sacrum* being broader before than behind, pretty much resembles the section of a cone. In the middle of it, we see a cartilaginous impression of an oblong figure, and cut very obliquely from before backwards, by which the *sacrum* is articulated with the body of the last lumbar *vertebra*. Two little masses, which are also articular, seem to be fixed on the posterior edge of this impression, near its extremities, and with them form channels which lodge the fifth pair of *lumbar* nerves, at their exit from the vertebral canal: these *apophyses* unite themselves to similar ones of the aforesaid *vertebra*, as we shall see hereafter.

32. The point of the *sacrum* presents also a cartilaginous *facette*, transversely oblong; but much smaller than that of the base, and inclined

in a contrary direction : and with that the *coccyx* is united.

33. The anterior face of the *sacrum* describes a curve of the depth of about half an inch. We observe in it four transverse lines, resulting from the consolidation of the five pieces which constituted this bone in early infancy. These lines terminate at each side in as many holes, which pierce the thickness of the bone very obliquely, and whose use is to give passage to the *sacral* nerves. These holes communicate with a canal, whose apertures may be seen on the posterior face of the *sacrum* : they are not all of the same size ; and some of them are lengthened in form of a groove, towards the edges of the bone : they are called the *sacral* holes.

34. The posterior face is convex, and rough with a great number of *tubercles*, of which some answer to the spinous *apophyses* of the *vertebræ*, and others to the oblique and transverse eminences. We see in it also eight holes, placed in two rows, whose use is to give passage to some nervous fibres and blood vessels. Above and below the spinous *tubercles* are two other apertures, nearly of a triangular figure, of which one forms the beginning, and the other the end of the *sacral canal*. From the extremity of this

canal descend two little productions, in the shape of a bodkin, which unite by means of a ligament with the superior and posterior part of the *coccix*.

35. Each edge of the *sacrum* presents superiorly a large cartilaginous impression, perfectly similar to that of the *os ilium*, with which it is joined. These articular impressions, nearly of a semilunar figure, are cut obliquely from above downwards, from without inwards, and from before backwards; so that their anterior edge and their superior extremity are farther from a line which would divide the *sacrum* vertically into two equal parts, than their posterior edge and their inferior extremity: whence we see that the *sacrum* is fixed between the *ossa ilia*, after the manner of a double wedge, with the base above and before. There is nothing very remarkable in the rest of the edges of the *sacrum*, unless it be a little notch in their inferior extremity. The length of this bone is usually from four inches to four and a half; its greatest breadth four inches; and its thickness, taken from the middle of its base anteriorly, to the extremity of the spiny *tubercle* of its first false *vertebra*, is two inches and an half. This last dimension varies so little, that I have not found

found a difference of a line in between thirty and forty *pelves*, the greater part of which were deformed; which is, as we shall see hereafter, very important to be known.

SECTION VI.

Of the Coccix.

36. THE *coccix* is usually formed of three pieces, which altogether produce nearly the figure of a pyramid, twelve or fourteen lines long, and sometimes more, a little bent forward, and bound by its base to the point of the *sacrum*. I shall say no more of these three pieces than what is necessary to shew their connections with each other, and with the *sacrum*. The breadth and thickness of the *coccix* diminish insensibly from the top of the first piece to the extremity of the last; we may consider in each of them a base, a point, two faces, and two edges. The base of the first presents an oblong *facette*, covered with a *ligamento-cartilaginous* substance, by which it is united to the extremity of the *sacrum*; and, at the sides and back part of this substance,

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stance,

stance, two longish *tubercles*, in which are inserted as many ligaments. The point is rounded, and covered by an articular cartilage, like a little flatted head : it is received into a superficial cavity which is observed in the base of the second piece, and forms with it a kind of articulation, whose motions, though limited, are preserved a longer time than those of the whole of the *coccix* on the *sacrum*. We find nearly the same relation, the same reciprocity of figure, between the point of the second piece and the base of the third ; consequently the same kind of connection. This third piece is longer and narrower than the preceding, and terminates in a sort of *tuberosity*, like the last *phalanges* of the fingers.

S E C T I O N VII.

Of the Union of the Bones of the Pelvis.

37. THE *ossa pubis* are joined together by means of a substance which has always been described by the name of *cartilage*, though it differs as much from that as from a ligament. According to some anatomists, each *os pubis* is covered

covered by its own cartilage : their junction is not a true *synchondrosis*, but a close articulation, which only admits of insensible motions.

38. By carefully examining this *symphysis*, we observe that each *os pubis* is really covered by a cartilage at its anterior extremity ; that this cartilage is thicker before than behind, and in its superior and inferior parts than in the middle of its length ; that these bones, thus covered, are bound together by means of a substance which seems ligamentous, and whose fibres, which are mostly transverse, go from one to the other ; that these fibres are so disposed, that the deepest are the shortest, and the most superficial the longest ; that they leave between one another a kind of meshes filled with reddish *corpuscles*, very like those which are seen about the movable articulations, and which are commonly supposed to be *synovial glands*. We observe, farther, that this fibrous and ligamentous substance does not occupy the whole thickness of the *symphysis*, and does not bind the bones together through the whole extent of the surfaces presented by their anterior extremities ; but that there exists a true articulation, of the species known by the name of *arthrodia*. If we open this *symphysis* towards the inside of the *pelvis*,

after a cellular tissue, very thin and loose, which we meet with first, we discover a capsular membrane, whose most apparent fibres are transversal ; afterwards two cartilaginous *facettes*, smooth, polished, and moist, from six to eight lines long, and two broad, of a figure a little semilunar, lightly convex on one bone, and concave on the other. These *facettes* comprehend nearly the middle third of the length of the *symphysis*, and the posterior third of its thickness. This *symphysis* then presents in one third of its extent, or thereabouts, a true articulation ; and, in the rest, a *syneurosis* and *synchondrosis* at the same time.

39. This compound and articular substance, being detached from the bones, forms a kind of wedge, whose base constitutes the anterior part of the *symphysis*, and its edge the posterior ; so that these bones seem to touch towards the inside of the *pelvis*, and appear separated to the distance of several lines without. The base of this kind of wedge is generally from four to six lines broad, towards the middle of the length of the *symphysis*, and from eight to ten in the inferior and superior parts ; while the edge, at most, does not exceed one line. Its thickness, taken according to that of the bones, is greater above than below ; where this substance, become thinner,

thinner, forms what is called the triangular ligament.

40. This first means of union was not sufficient to give these bones the firmness necessary for the free exercise of the functions to which the *pelvis* is destined ; it is covered and fortified in all parts, but especially before, by bundles of ligamentous and aponeurotic fibres. Independently of the thick and very strong ligamentous structure which forms the fore part of the *symphysis*, we observe bundles of tendinous fibres, which decussate each other a thousand ways, some of which arise from the interior *graciles* and the external *obturators*, and others from the external portions of the inguinal rings. I shall remark, too, that the triangular expansion which terminates the *symphysis* inferiorly, and which forms the top of the arch of the *pubes*, seems to have other uses than that of binding the bones together.

41. The *os sacrum* is engaged like a wedge between the posterior parts of the *ossa innominata*, to which it is united. Although some anatomists pretend that this union is like that of the *ossa pubis*, yet we may observe a great difference between them ; for here each articular *facette* is covered by a true cartilaginous layer,

and we see on each side inequalities which are mutually received ; but we see nothing of that kind in the junction of the *pubes*. These articular cartilages have not the same thickness on each bone ; that which belongs to the *sacrum* being nearly throughout one line thick, and that of the *os ilium* being extremely thin. They are whitish, streaked as it were in many places and moistened with a small quantity of *synovia*. We cannot discover, in any part of these articular surfaces, any transverse fibres which go from one bone to the other, as is observed in the connection of the *ossa pubis* ; so that these articulations, which I shall often mention by the name of *sacro-iliac symphyses*, derive all their strength from the great number of ligaments which surrounds them.

42. Most of these ligaments are very short, and do not extend beyond the edges of the articular *facettes* : there are others longer, to be seen above, below, and behind these *symphyses*.

43. The former may be called the anterior *sacro-iliac* ligaments : they are disposed like bands which pass transversely from the anterior edge of the articular *facette* of the *os ilium* to the edge of that of the *sacrum*, and the greater part are very thin. The strongest and thickest of

these ligamentous bands are before the summit of the *sacro-sciatic* notch, and at the bottom of the *sacro-iliac symphysis*; we must likewise add a capsular membrane.

44. The most remarkable superior ligaments are two on each side. One descends from the inferior edges of the transverse *apophyses* of the last *lumbar vertebra* to the superior edges of the articular *facettes* of the *sacrum* and *ilium*, spreading itself over the top of the *symphysis*; and the other goes from the points of those same *apophyses* to the angle made inwards by the *crista* of the *ilium*, from whence they advance a little forward, and form a kind of small *falx* above the *iliac fossa*.

45. The inferior ligaments, one on each side, known by the name of *sacro-ischiatic*, arise from some of the inequalities of the posterior part of the *sacrum*, the *coccyx*, and even of the *ilia*: they are broad and thin backward, but they narrow and thicken as they advance forward. Towards the middle of the *ischiatic* notch, these ligaments divide themselves into two branches, the shorter of which terminates in the spine of the *ischium*, and the longer in the internal lip of its tuberosity: this latter advances towards the *pubes*, and in its course forms a kind of *falx*, which
has

has caused it to be called the falciform ligament. These two ligamentous branches leave between them a kind of triangular space, through which pass some nerves, and the *tendon* of the internal *obturator*.

46. The posterior ligaments, more numerous and shorter, but much stronger and tighter, than these last, go from the *os ilium* to the *tubercles* of the *sacrum*, which by their situation resemble the oblique *apophyses* of the second, third, and fourth false *vertebræ*, of which this bone was originally formed.

47. The *sacrum* is not only articulated with the *ilia*, but also with the *spine* and *coccyx*. It is joined to the *spine* in three different places: 1. It is united by that cartilaginous impression transversely oblong, which we see in the middle of its basis, to a similar impression in the body of the last lumbar *vertebra*, by means of an elastic substance; 2, and 3, by the two little articular masses which are fixed in the posterior edge of that first impression, and which answer to similar substances in the *vertebra* before mentioned.

48. The elastic substance which unites the middle of the base of the *sacrum* to the *spine*, is entirely similar in its nature to that seen between
the

the bodies of all the *vertebræ*. It is very thick before, and thin behind; which renders the angle necessarily resulting from the disposition of the articular *facettes* of these two parts more obtuse. This *sacro-vertebral* junction is surrounded by an infinity of ligaments, some without, and others concealed within the spinal canal.

49. All motion is not prohibited in this kind of junction; but, as it only depends on the compression of the intermediate substance, it can be but very small. If the *pelvis* executes a larger motion on the *trunk*, we must regard it as one composed of those which take place between each of the *lumbar vertebræ*, and between the lower ones of the back*.

50. The motion which is permitted between the body of the last *lumbar vertebra* and the base of the *sacrum*, is never extensive enough to make any alteration in the degree of acuteness of the angle which results from their junction;

* It would be an error to believe, as some have done, that the projection formed by the union of the *sacrum* with the last *lumbar vertebra*, may be augmented or diminished by that motion; and that error might contribute to deprive women of a means which generally relieves those troublesome pains in the back, which so frequently torment them during labour.

but

but the convexity of the *lumbar column* may be augmented or diminished, by means of the compound motion just mentioned, according as the trunk is bent backward or forward, or by raising or lowering the breech when the woman lies on her back; which merits particular attention in the practice of midwifery. We may by this means make a favourable change in the direction of the axis of the *pelvis*, relatively to that of the *trunk*, to that of the *uterus*; and in the direction of the expulsive forces of the latter, which may be rendered more or less efficacious, according to circumstances, by making the woman preserve a proper attitude.

51. The junction of the *coccyx* with the *sacrum* is entirely similar to that called *sacro-vertebral*, with respect to the medium which constitutes it: it permits that appendix to move, and yield to the pressure it undergoes in different circumstances. This mobility, which is extreme in youth, diminishes insensibly, and in time is entirely lost. If it diminishes considerably, or is lost before the time in which a woman becomes sterile, it produces in some cases, but very rarely, an obstacle to delivery.

52. The *pelvis* has connections with the inferior extremities, which are not so important
for

for the accoucheur to know as some have endeavoured to persuade us. Any fault in them cannot disturb the natural course of labour, when the *pelvis* is well formed; and in general they are a consequence of the deformity of that. These articulations are *enarthroses*, which permit motion in every direction.

Explanation

Explanation of the First Plate.

THIS figure represents a well-formed *pelvis*, whose parts are all reduced to about half their natural size.

A, A, A, A, The *ossa ilia*, properly so called.

a, a, The *iliac fossæ*.

b b, b b, The angle which divides transversely, and obliquely from behind forward, the internal face of the *os ilium* into two parts, and which makes part of the brim of the *pelvis*.

c c, c c, The *cristæ* of the *ossa ilia*.

e, e, The anterior superior spines of the *ossa ilia*.

f, f, The angle formed by the internal lip of the *crista* of the *ilium* towards the extremity of its anterior two-thirds, and to which is attached a ligament inserted at the other end in the transverse *apophysis* of the last *lumbar vertebra*.

g, g, The inferior angle of the *os ilium* which makes part of the *acetabulum*.

B, B, The *os ischium*.

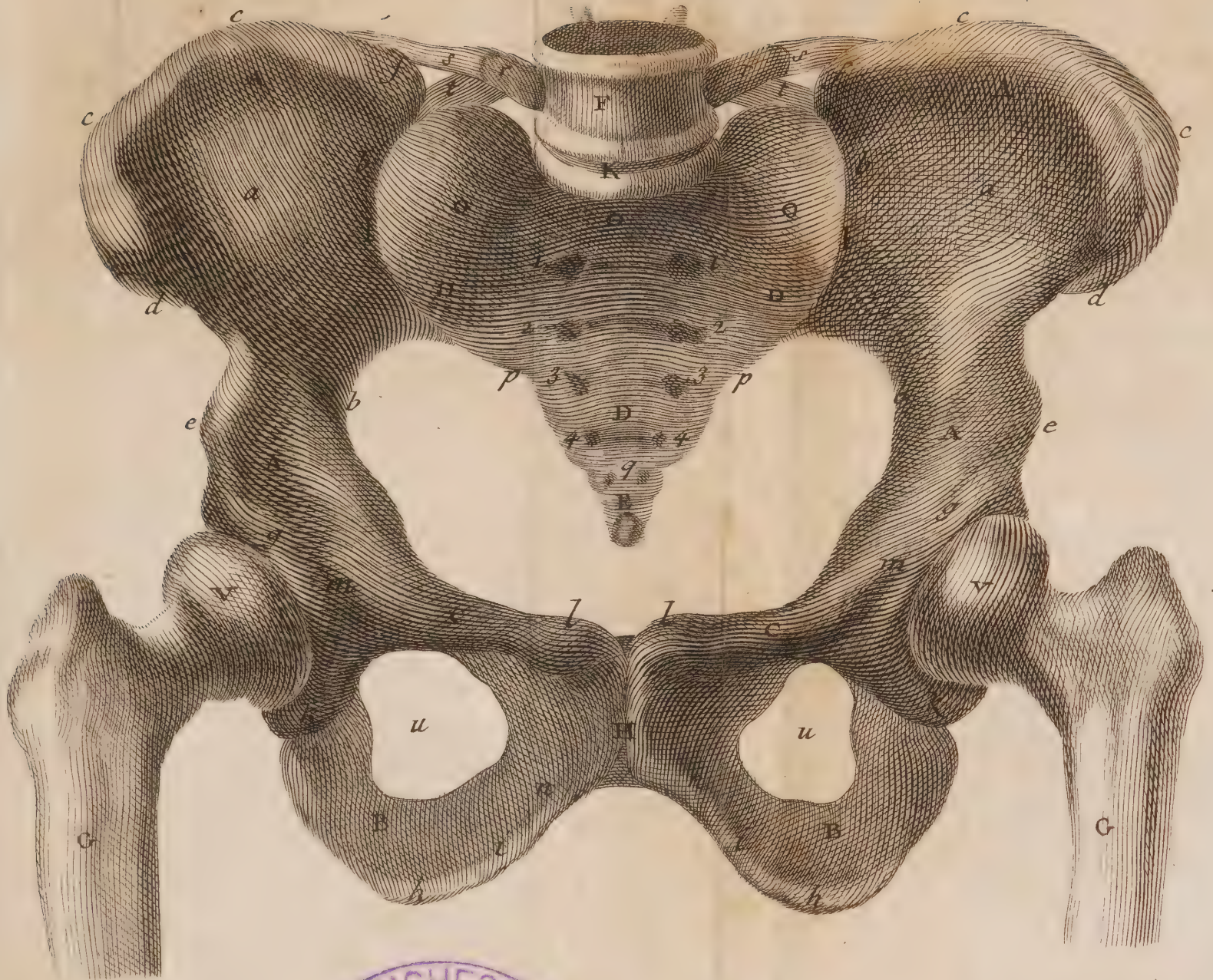
h, h, The tuberosities of the *os ischium*.

i, i, The branches of the *os ischium*.

k, k, The posterior part of the *os ischium*, which makes part of the *acetabulum*.

C, C, The body of the *os pubis*.

l, l, The angle of the *os pubis*.



Chailly del.



devisse Scul.



m, m, The posterior extremity of the *os pubis*, which makes part of the *acetabulum*.

n, n, The descending branch of the *os pubis*, which unites with that of the *ischium*.

D, D, D, The *os sacrum*.

1, 2, 3, 4, The anterior *sacral holes*.

o, o, o, The base of the *sacrum*.

p, p, The sides of the *sacrum*.

q, The point of the *sacrum*.

E, The *coccix*.

F, The last lumbar *vertebra*.

r, r, The transverse *apophyses* of that *vertebra*.

s, s, The ligament which goes from the transverse *apophysis* of the last *vertebra* to the angle of the internal lip of the *crista* of the *os ilium*, indicated by the letters f, f.

t, t, Another ligament, which descends from those same *apophyses* to the superior edge of the *sacro-iliac symphyses*.

G, G, The *femur*, or thigh bone.

V, V, The head of the *femur* received in the *acetabulum*.

u; u, The *foramina ovalia*.

Symphyses of the Bones of the Pelvis.

H, The *symphysis* of the *ossa pubis*.

I, I, The *sacro-iliac symphyses*.

K, The *sacro-vertebral symphysis*.

S E C T I O N VIII.

Of the Separation of the Bones of the Pelvis in Labour.

53. HOWEVER firmly the *ossa innominata* and the *sacrum* are united together—however numerous the means which nature has employed to give this assemblage the stability necessary for the free exercise of the motions of the trunk and inferior extremities, of which it is in some sort the center—their *symphyse*s may nevertheless be relaxed and weakened to such a degree, as to allow an apparent mobility; they may yield to the impulse of external agents; even by the efforts of labour they may extend, or tear, and permit the bones to separate; which in either case might seem necessarily to procure a greater capacity in the *pelvis*, and give an easier passage to the child: such in fact is the opinion of the greater part of those who have written on the art of midwifery for these two thousand years. The divine wisdom, which presides over all things, appeared to them equally wonderful in this separation, and in the solidity which it was likewise necessary to give to the *symphyse*s of
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the *pelvis*; and without this double advantage, according to those authors, the woman could not have transported herself from place to place so conveniently and safely, nor bring forth children so easily.

54. All authors have not however had the same idea of the separation of the bones of the *pelvis*. If some, zealous admirers of the resources of nature, entirely occupied in the preservation of the mother and child, have found nothing in it but an effect worthy of her providence; others have regarded it as a morbid state, and many have even contested its possibility.

55. Such has been in all ages the variety of opinions on this point. It is very certain that the bones of the *pelvis* may separate in labour, but that does not happen so often as has been thought; and experience demonstrates that this separation, far from being common, is very rarely met with, and is not more usual after a laborious, than after an easy labour; nor in a distorted *pelvis*, than in one well formed. I have sought for it twenty times in all these cases, by opening the bodies, and have scarcely met with one which could remove all doubt of its existence.

56. The infiltration of *serum* into the liga-

mentous tissue of the *symphyses*, must be regarded as the most usual predisposing cause of the separation of the bones of the *pelvis*, and whatever may occasion that infiltration will become the remote cause. The pressure which the *uterus*, loaded with the produce of conception, exerts during several months on the trunks of the vessels which are distributed to these *symphyses*, and on those which return the blood from the inferior extremities, cannot alone produce this effect; and, for it to take place, we must likewise admit a peculiar alteration in the fluids, to render them fitter for it. This pressure is nearly the same in all women who have the *pelvis* well formed; and yet the relaxation of the *symphyses* does not exist in all of them at the time of labour. It is also more considerable in women pregnant of several children, as well as in those who have a narrow *pelvis*; and nevertheless the relaxation is not more frequent in those cases than in others. In examining the bodies of several women who had the *pelvis* singularly deformed, I found the *symphyses* as firm and tight as in the natural state, although they died in childbed; and there was in several of them a considerable collection of fluid through the whole extent of the inferior extremities, and of the *pudendum*. Whatever
may

may be the remote cause of the relaxation of the *symphyfes*, that accident is not less the most usual predisposing cause of the separation of the bones of the *pelvis*; and it was acknowledged to be such in the time of *Severin Pineau*.—See his *Opusc. d'Anat. et de Physiolog.*

57. Though the relaxation of the *symphyfes*, produced by the infiltration of *serum* into their ligamentous tissue, is generally regarded as the predisposing cause of the separation of the bones of the *pelvis*, the swelling of the cartilages which make a part of those *symphyfes* cannot be looked upon as the immediate cause of it. Whatever relaxation may affect the ligaments, the cartilages which incrust the extremities of the *ossa pubis*, as well as the articular *facettes* of the *ossa ilia* and the *sacrum*, are no thicker: therefore they cannot act as so many wedges placed between those bones, as the roots of ivy do which grow and extend themselves in the clefts of rocks; or like wedges of dry wood drove into holes bored in them, in order to separate large masses from them *. The structure of the *symphyfes*, better known at present, no longer admits those ingenious *comparisons*; and the explication of the phe-

* See *Memoires de l'Académie Royale de Chirurgie*, t. iv. *Dissertation sur l'Ecartement des Os du Bassin*, par M. Louis.

nomena is not less clear on that account. The wedge which separates the bones of the *pelvis* does not act between the extremities of those bones, but in the circle formed by their assemblage in the *pelvis* itself; it is the *uterus* charged with the produce of conception in the latter periods of pregnancy, and the child's head forced down by the action of the *uterus* and of the abdominal muscles in time of labour. However considerable this separation may be on some occasions, we may presently place the bones again in their natural contact, and render the *symphyfes* as close, though not so solid, as they were originally; which could not be done if the cartilages were tumefied, as some have published. The error of many authors concerning the greater capacity in the *pelvis*, and a greater breadth of hips, even in women who have had but one child, is a consequence of the former; and could only arise from the idea which was entertained, that the cartilages which make part of the *symphyfes* swell during pregnancy.

58. The separation of the bones of the *pelvis*, which sometimes happens in labour, is not always the effect of a relaxation and stretching of the ligamentous tissue of the *symphyfes*. Little disposed to yield thus, in some cases in which the obstacles
which

which obstruct the passage of the child are very great, and the efforts which tend to expel it very strong and lasting, the *symphyfes* tear, and permit the bones to separate much further than they could have done by a simple relaxation. If the passage on that account becomes freer, the consequences of it are also much more disagreeable: being the same as those which have often been observed after the section of the *symphysis* of the *pubes*, I shall take notice of them when I come to treat of that new operation, and shall relate some examples of the rupture in question. That the word *rupture*, which I use here, may not be a cause of error, I must add, that it is not the *symphysis* of the *pubes*, properly speaking, which tears, for no effort can break the ligamentous substance which unites those bones to each other; the *symphysis* detaches itself from one of them, and leaves the bone naked.

59. The natural efforts of labour are not the only ones which may operate to this disunion of the *ossa pubis*: it has taken place in instrumental deliveries, to which those efforts seemed to contribute nothing; and it has sometimes been found in consequence of an external percussion, or of a fall.

60. Being deceived in the principle of this separation, they necessarily erred in the consequences deduced from it. It has been so firmly believed to take place in all labours, that it was thought to be absolutely necessary, and that without it many women could not be delivered but with extreme difficulty. “It would be in vain,” says *Severin Pineau*, “that the neck of the *uterus* and the other soft parts should dilate to give a passage to the child, if the bones could not separate:”—“otherwise (adds *Paré*) the child could not pass through so narrow a way.”

61. Having thus mistaken the necessity and pretended advantages of this separation, the natural resistance of the *symphyse*s, and, above all, the dryness and rigidity necessarily induced in them by age, were consequently reckoned among the causes of laborious and difficult labours. Obstacles have been attributed to the state of these *symphyse*s, which merely depended on the resistance of the neck of the *uterus*, and of the external parts; and it has been recommended to moisten and relax them by the use of baths, cataplasms, liniments, fomentations, &c. But what can be expected from such methods, when delivery is obstructed by a narrow *pelvis*?

62. Will

62. Will any one venture to assert that he has once by such means obtained the effect he expected, and that he has thus assisted labours which could not otherwise have been terminated but by the Cæsarean operation, as has been so often published? I should have dispensed with demonstrating the fallacy which has prevailed on this point, if it had not led some practitioners into a very serious consequence *; but the interests of humanity, and the honour of the art, oblige me to expose it, and if possible endeavour to dissipate it. In order to appretiate all these means, and fix the degree of confidence to be placed in them, supposing that they could operate to the relaxation of the *symphyfes* of the *pelvis*, it is necessary to determine what degree of amplitude can be given to that cavity, by the separation of the bones which constitute it.

63. The *ossa pubis* cannot separate without augmenting the circumference of the *pelvis*. That is a fact so certain, that the smallest doubt of it would be a proof of ignorance. But how much will its diameter be increased? If the circumference were perfectly circular, every possible diameter would partake a third of that augmentation; but as the entrance of the *pelvis*

* See the Chapter on the Section of the *Pubis*, vol. ii.

is in general the more elliptic as it deviates more from the natural state, it follows that its different diameters cannot increase in the same proportion, and that there is, as I may say, none but the transverse which can become larger.

64. The augmentation of the *antero-posterior* diameter is reduced almost to zero, when the separation is moderate; and repeated experiments have demonstrated that the *ossa pubis* must separate at least an inch, to procure two lines in that direction; while the transverse diameter shall be increased six lines, and often more.

65. The *pelvis* being larger in most women than is necessary for delivery, the separation of the bones could be of no advantage to them, nor render their delivery more easy. Far from regarding it, with some ancient authors, as a benefaction of nature, we ought to consider it as an additional source of inconveniences in those women who are subject to it; for on one side we see that a *pelvis* too large exposes the woman to a number of accidents*; and, on the other, that there are some which inevitably accompany the separation, and the mobility of the bones which form that cavity. Far from favouring delivery in all these cases, it could

* See Nos. 86 and 87.

not but render it more tedious and painful to the woman, as experience has convinced me *. If we ought to expect any real advantage from it, considering it only with respect to the passage of the child, it could only be in those women who have the *pelvis* deformed; and where the defect which rendered delivery impossible did not exceed two lines at the most, since a separation of an inch cannot procure an augmentation of more than two lines in the small diameter of the superior *strait* (see par. 64), which is almost always that which occasions the greatest obstacles to the exit of the child. If from a separation of an inch, which has never taken place between the *ossa pubis* without a rupture of their *symphyses*, we are not to expect an aug-

* A woman of a good habit, and of the middle age, who had been delivered of her first children so quickly that I could scarcely reach her in time, though not far off, in the latter months of her pregnancy felt acute pains in the *symphyses* of the *pelvis*, which made her walk with uncertainty and difficulty, and even lamely. These pains, supportable then, became so troublesome and violent during labour, and especially while she endeavoured to bear down and assist her delivery, that nothing could engage her to repeat it, nor to alter the attitude which she had mechanically taken, to relax all the muscles that are attached to the *pelvis*: which rendered the labour longer and more painful than the preceding, although the child was much smaller than the former.

mentation

mentation of more than two lines, in the direction of the little diameter of the superior *strait*, what can we obtain from a separation always much less, and so little apparent in most women that we may doubt its existence? The examination of a great number of women who have died in childbed has proved to me that it is excessively rare for the separation in question to amount to two lines; and I never found it exceed that but once *.

66. But supposing, which is impossible, that art could procure a separation of an inch between the *ossa pubis* without dividing their *symphyses*, what practitioner would dare to affirm, without fear of being deceived, that the volume of the child's head did not exceed the little diameter of the superior *strait* by more than two lines? If it is difficult to estimate justly the degree of opening in the *pelvis*, it is much more difficult still to judge of the size of the child's head; and it is only by taking the mean between the largest and smallest, that we usually establish the relation of its dimensions to those of the *pelvis*; but a *thereabouts* in the case supposed, cannot supply

* The relaxation of the *symphyses* of the *pubes* was so great, that we could separate them fourteen lines, and put them again in contact. The *pelvis* was of the largest size, and the body entirely putrid.

the place of that precision which would be necessary.

67. We see clearly by these reflections what we ought to think of the means proposed by *Severin Pineau*, with a view of favouring the amplification of the *pelvis*; as well as of those accoucheurs who boast of having delivered women by those means, who must otherwise have undergone the Cesarean operation.

68. The proscription of the section of the *symphysis* of the *pubes*, though performed several times within these ten years with all the success its author could desire, seems an inevitable consequence of those same reflections; that operation being the fruit of an opinion too hastily embraced by persons of science, but too credulous concerning the pretended advantages of the spontaneous separation of the *ossa pubis*.—See the sequel of this work.

69. If I have clearly demonstrated the inutility of the most usual separation of the bones of the *pelvis* in labour, how often has experience shewn the danger of it! Even if it were in the power of art to procure this separation without cutting the *symphysis* of the *pubes*, if that separation could in some cases destroy the obstacle which obstructed the exit of the child—have the
consequences

consequences of a spontaneous separation always been so fortunate as to authorize us to give it the preference to other means equally fit to procure that effect, and almost always exempt from inconveniences either to the mother or the child?

70. When this separation has been made suddenly, severe pains in the parts divided, an impossibility of walking, and sometimes even of moving the inferior extremities, inflammation, fever, abscesses, caries, and lastly death itself, have generally been the mournful effects of it. When it only proceeds from a relaxation of the *symphyses*, the consequences are much less severe, it is true; since a painful and tottering walk is the only symptom attending it.

71. If the relaxed *symphyses* at length grow firm again, if the bones of the *pelvis* recover their former stability, if the lameness goes entirely off in some women—how often, on the contrary, have we not observed an inability to walk, or even to move the legs without violent pain, continue for years afterwards!

72. We should be in the wrong if we were to suppose that such a state of weakness and pain always denotes great disorders in the junction of the bones of the *pelvis*. I am convinced
that

that those accidents may be the consequence of a very small separation, and of the slightest movement between the *ossa innominata*. A woman to whom I was called had kept her bed ten months, a prey to the most excruciating pains in the junction of the *ossa pubis*, and of one of the *ilia* with the *sacrum*, whenever she attempted to move the inferior extremities, though we could not discover the least separation of the *symphyses*; we could only find a small degree of mobility in that of the *pubes*. The accident had been first felt in the time of labour, and the midwife was accused of having luxated the bones. The lameness which results from the relaxation of the *symphyses* of the *pelvis* is not always so painful; if the woman suffers pain at first whenever she attempts to walk, it lessens gradually, because the parts which constitute the *symphyses* accustom themselves to the dragging occasioned by the mobility of the bones.

73. According to these observations, the separation of the bones of the *pelvis* will appear to be an unnecessary accident, and sometimes a very serious one; since it may influence the subsequent symptoms, and even affect the life of the woman, or render her existence a long time burdensome. Topical astringents, aromatic

tic fumigations, the cold bath, even almost freezing, are the most proper means, in case of relaxation, to restore the lost tone to the *symphy-ses*; but they cannot be used in the first periods, for fear of suppressing the evacuation of the *lochia*. In the mean time we must prescribe rest; and fix the bones of the *pelvis* by a proper bandage, if the case require it *. The indications are very different, and much more urgent, when the *symphy-ses* are ruptured: we must prevent inflammation and its consequences, open the abscesses when fit, and treat the caries (which is sometimes the consequence) properly, &c. We are fortunate when the woman escapes even so.

* A few turns of a bandage rolled tight on the *pelvis* were sufficient, in a woman who had been delivered eighteen or twenty days, to enable her to walk in her chamber, though before she could not move in her bed without great pain: no other means were used but that bandage. Another woman, who had been delivered nine months, having used topical astringents and aromatic fumigations without success, could not recover the faculty of walking but by the use of cold baths almost freezing.

SECTION IX.

Of the Division of the Pelvis, and of its natural Dimensions.

74. A RIDGE, rarely circular, often elliptic, and sometimes of another figure, but always more or less inclined forward, divides the cavity of the *pelvis* into two parts ; of which one forms the upper, the other the lower part.

75. The upper part of the *pelvis*, which the French call the great *basin*, is very wide at the sides, and quite open before. Its breadth, taken from the anterior superior spine of one *ilium* to that of the other, is usually eight or nine inches, and its depth from three to four. We see in the back part of it the projection of the *lumbar vertebrae*, and at the sides the *iliac fossae*. The knowledge of this part is not the least interesting with respect to delivery.

76. The lower part, called by the French the little *basin*, forms a kind of canal, whose entrance and outlet are somewhat narrower than the middle ; which has caused it to be distinguished into the superior *strait*, the inferior *strait*, and an *excavation*.

77. The

77. The superior *strait* is that ridge mentioned in par. 74; it is a kind of circle which forms the entrance of the canal. (See the second plate). Its form is not constantly the same, as I have already remarked; its inclination or obliquity from behind forward, which an accoucheur of the first rank has fixed at from thirty-five to forty degrees (see M. Levret), cannot be exactly known, because it varies a little in every subject.

78. To determine the extent of the superior *strait* more exactly, it is necessary to take notice of its several diameters. The smallest, whose length is in general about four inches, extends from the middle of the projection of the *sacrum* to the superior and internal part of the *symphysis* of the *pubes*. The longest extends from one side of the *strait* to the other, and is usually an inch longer than the preceding. The others are the two oblique diameters: they are of a middle length between the two former; they extend diagonally from each *acetabulum* to the *sacro-iliac* junction of the opposite side. The two former cut the *pelvis* at right angles, and the two latter divide those angles into acute ones.

79. The respective length of these diameters, considered relatively to delivery, is not
what

what I have just indicated; the soft parts within the *pelvis* causing some changes in them. If they all equally lose of their length on account of the thickness of the neck of the *uterus*, which is not much when it is entirely developed, being then not thicker than three or four folds of paper, it is not the same with respect to the muscles. The long or transverse diameter is almost the only one which the *psoæ* diminish in their passage: they diminish it more or less in different subjects, according to their bigness, and according as the *pelvis* is more or less of an elliptical figure; but always so much as to make this diameter appear, at the first cast of the eye, shorter than the oblique. If these muscles take a little from the posterior extremities of the oblique diameter, yet that does not hinder them from being the longest; and we ought to consider them as such in respect to delivery, except in some deformed *pelves*.

80. The inferior *strait*, in general smaller, and of a more irregular figure, than the superior, is not, like that, entirely formed of bony parts; its edge, which three large and deep notches render unequal, being completed behind and at the sides by the *sacro-ischiatic* ligaments, and forming before a kind of circular notch, called the arch of

the *pubes*. (See the third plate.) We are also to remark as many diameters in it as in the superior *strait*, and their length is commonly about four inches. Although the transverse, or that which extends from one *ischium* to the other, be often a little longer than that which goes from before backward, it must however be reckoned the smallest with respect to delivery, because the latter augments in proportion as the point of the *coccyx* recedes from the *pubes*. It is very useful to bear in mind, that the great diameter of the inferior *strait* is parallel to the smallest of the superior, and that it crosses the longest of that *strait* at an angle more or less acute. This observation, important for the explication of some of the phenomena of common labour, becomes infinitely more so in the management of difficult labours; and by taking advantage of it, in many cases, the finger alone, well directed, will dispel obstacles which would have been difficult to overcome with instruments, or which could not be overcome by those means without exposing the child to great inconveniences, as I shall remark in the sequel.

81. The middle part of the *pelvis* is a little larger from before backwards than the *straits*; and this disposition, which proceeds from the
curve

curve of the *sacrum*, is as favourable to delivery, as the excess or defect of that same curve would be contrary to it. On one side it diminishes the numerous and long-continued frictions which the child's head must necessarily undergo, if the *pelvis* were of the same breadth in all parts; and, on the other, it is not less useful in preventing the effects of a long and forcible pressure on the sacral nerves, which a flat form of the *sacrum* would have rendered inevitable during the whole passage of the head.

82. The cavity of the *pelvis* is not equally deep in every part; it is commonly from four to five inches deep behind, three and an half or thereabouts at the sides, and at most eighteen lines before.

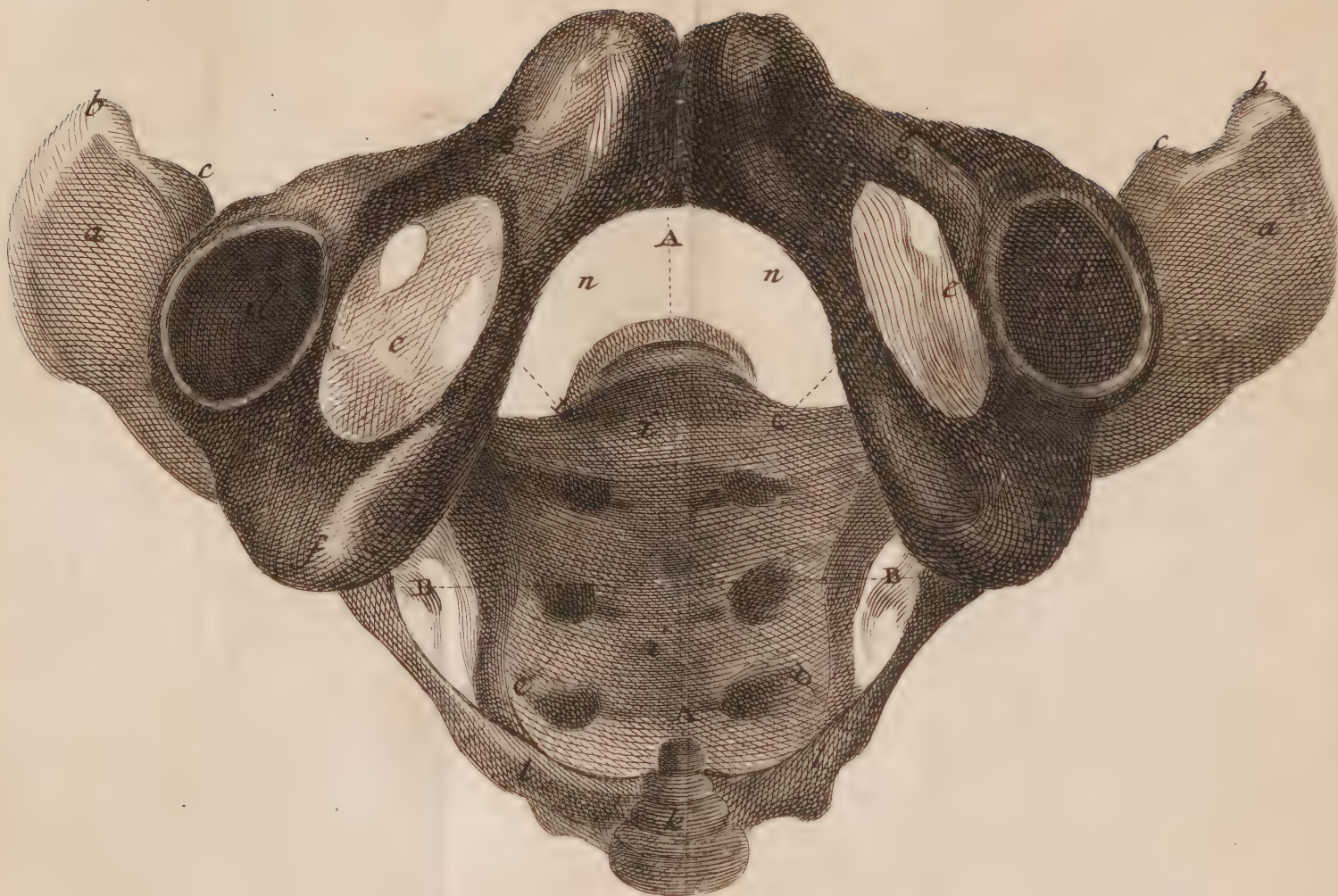
83. The arch of the *pubes* does not merit less to be well understood than the parts I have just described, since its form and dimensions may equally influence the mechanism of labour. This arch, rounded at its superior part, and only from fifteen to twenty lines broad, augments insensibly as it descends; so that its sides are more than three inches and an half apart at the bottom, even four inches, if we take the line which is looked on as the transverse diameter of the in-

ferior *strait*, for its base : its height is about two inches.

84. The axis of the *pelvis* is difficult to determine, because the same line cannot traverse the centers of the two *straits*; and, besides, any axis that could be assigned would not be the same in every subject, nor in every attitude of the body.

The axis of the superior *strait* seems to be almost as much inclined from before backwards, as the *strait* itself is in the contrary direction : one of its extremities passes under the *umbilicus*, and the other towards the middle and inferior part of the *sacrum*. The axis of the inferior *strait* must be considered, relative to delivery, as passing through the center of the opening of the *vagina* dilated by the child's head : its direction is then so much inclined from behind forward, that its superior extremity traverses the lower part of the first false *vertebra* of the *sacrum*, and crosses that of the other *strait* at a very obtuse angle.





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devisse . Sculp .

Explanation of the Second Plate.

THIS figure represents the entrance or superior *strait* of a well-formed *pelvis*, reduced to the half of its natural dimensions.

a, a, The *iliac fossæ*.

b, The *sacro-vertebral* angle, or the projection of the *sacrum*.

c, The last *lumbar vertebra*.

d, d, The lateral parts of the base of the *sacrum*.

e, e, The *sacro-iliac symphyses*.

f, f, The parts over the *acetabula*.

g, The *symphysis* of the *pubes*.

The lines indicate the different diameters of the *superior strait*.

A, B, The *antero-posterior* or little diameter.

C, D, The transverse or great diameter.

E, F, Oblique diameter, which extends from the left *acetabulum* to the right *sacro-iliac* junction.

G, H, Oblique diameter, which goes from the right *acetabulum* to the left *sacro-iliac symphysis*.

Explanation of the Third Plate.

THIS figure represents the inferior *strait* of a well-formed *pelvis*, reduced to the half of its natural size.

a, a, The external faces of the *ossa ilia*.

b, b, The anterior superior spines of the *ossa ilia*.

c, c, The anterior inferior spines of the *ossa ilia*.

d, d, The *acetabula*.

e, e, The *foramina ovalia*, with the obturator ligaments.

f, f, The *ischiatric tuberosities*.

g, g, The *ossa pubis*.

h, h, The branches of the *os pubis* and *ischium* united.

i, i, The *sacrum*.

k, The *coccix*.

l, l, The *sacro-ischiatric* ligaments.

m, The *symphysis* of the *pubes*.

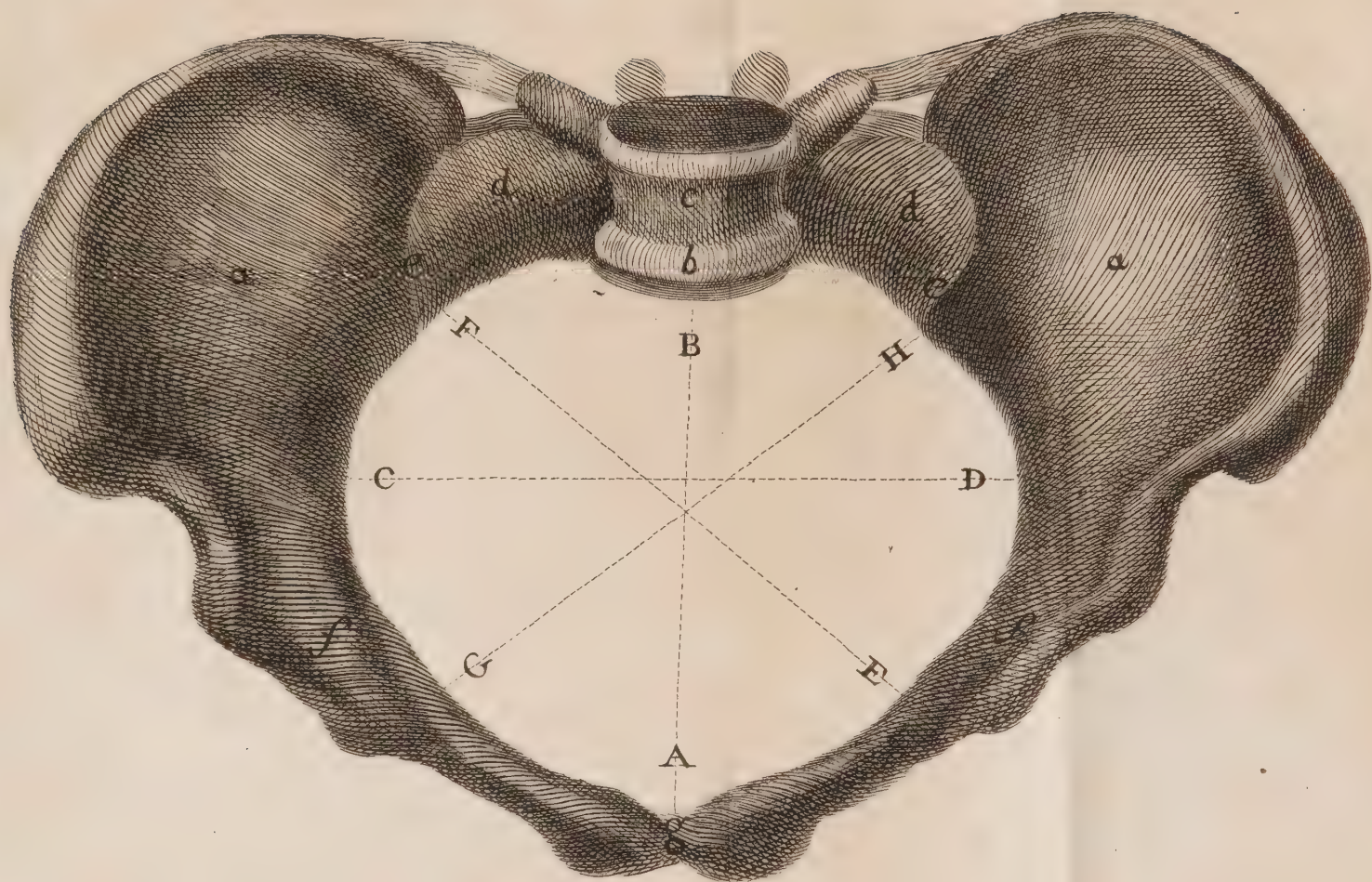
n, n, The arch of the *pubes*.

The lines indicate the diameters of the inferior *strait*.

A, A, The *antero-posterior* or great diameter.

B, B, The transverse or little diameter.

C C, D D, Oblique diameters.



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SECTION X.

*Of the Deformities of the Pelvis, considered with
respect to Delivery.*

85. THE different states in which the dimensions of the *pelvis* vary so much from those I have just described, as to disturb the natural order of labour, and render it more or less difficult, ought to be accounted so many deformities, if we consider them relative to that function: they all consist in the excess or defect of size in that cavity.

These principal faults may affect all parts of the *pelvis*, or one alone; and often one of these faults is the consequence of another, or arises from the same cause. Their shades are so numerous, that it would be in vain to expect to distinguish them all by the touch. I shall speak here only of those most essential to be known.

86. It seems at first sight that a delivery should be the more fortunate, as the *pavio* is of a larger size; because the child's head must undergo less friction in its passage, fewer efforts are required to expel it, and the labour is less painful. Although this be generally true, as to de-

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livery,

livery, strictly speaking, yet experience has but too often taught that this slender advantage is dearly paid for by lasting inconveniences, either before or after delivery ; so that we cannot regard the most spacious *pelvis* as the greatest indulgence of nature, relative to this important function. Women who enjoy a conformation so favourable in appearance, are more exposed than others to the effects of obliquity of the *uterus*, and to its descent ; especially in time of labour, when that *viscus*, already charged with the weight of the child, is entirely subjected to the expulsive force of the abdominal muscles. Feebly retained by its ligaments, in women who have already had several children, the *uterus* is habitually lower, and descends lower still in the subsequent pregnancies, till it be sufficiently developed to rest on the margin of the *pelvis* ; which does not take place till after the first four or five months. Before that time it gravitates strongly on the extremity of the *rectum*, and as well by its weight as volume impedes the discharge of the *fæces* and urine, as well as the free course of the blood in the veins which pass through the *pelvis* ; which is often the cause of very important accidents. If they partly vanish towards the middle of pregnancy, they sometimes

times re-appear at the latter end, because the child's head engages early in the *pelvis*; and acts, as it increases, on the same parts, as the totality of the *uterus* did before. If we add to these accidents those which may result from a too sudden and too easy delivery, it will not appear surprising that I should reckon an excess of amplitude in the *pelvis* among the faults in the conformation of that cavity.

87. It is indeed easy to prevent some of these accidents, and to remedy others; but there are some to which we can apply no remedy. We may remedy the descent of the *uterus*, and the accidents which depend on it, by means of a proper *pessary*: we may also keep that *viscus* in its natural position, when it has taken an unfavourable one. We prevent it from prolapsing in time of labour, by keeping the woman in an horizontal position; by recommending to her not to make the most of her pains, that is to say, not to bear down at all; by supporting the edge of the orifice till the head has cleared it; and taking care that it be not dragged along by the child's shoulders, in extracting the *trunk*.

88. When the neck of the *uterus*, charged with the child's head, is so far prolapsed that the head appears entirely without the *pelvis*, we must

must begin by extracting the child, with all possible precautions not to aggravate the evil already existing; and then the *uterus*, diminishing in volume, will easily return. When things are less advanced, we begin by pushing back what is prolapsed, and proceed as directed above; that is to say, we are to support the neck of the *uterus* till the child be disengaged from it.

89. The accidents which have no other remote cause than the too great capacity of the *pelvis*, are in general much less troublesome, and more easy to avoid, than those which arise from the narrowness or defect of size of that canal; this last fault being capable of affecting the lives of both mother and child, by obstructing delivery, or rendering it extremely difficult.

90. The narrowness of the *pelvis*, considered with respect to delivery, ought to be distinguished into relative and absolute. The former arises from the extraordinary size of the child's head, or from its bad position; the latter, from the bad conformation of the *pelvis* itself. To fix a just estimate of the various degrees of both these species, and determine the consequences they might produce, it would be necessary to know exactly, *à priori*, the extent of the *pelvis* affected by them, as well as the volume and solidity

lidity of the head which must pass through it. As it is impossible to appretiate the size of the latter, I shall suppose it constantly to be three inches six lines in diameter, from one parietal protuberance to the other, in order to establish some general *data*.

91. Absolute narrowness, the only species of which I shall speak here, is rarely found in all parts of the *pelvis* at the same time; in general it affects but one of the *straits*, and in that case the other is pretty commonly of the natural size, and sometimes a little larger than usual. This fault is more frequent in the superior *strait* than in the inferior; and we observe that it almost always affects the *strait* in its small diameter, and very rarely in the transversal; and sometimes it only affects one side. We remark the contrary in the inferior *strait*; for there it is generally caused by the approximation of the *tuberositities* of the *ischia*.

92. It is easy to determine why the superior *strait* is oftener deformed than the inferior, and why it is almost always between the *pubes* and *sacrum* that it is defective respecting delivery. If we consider the direction of the forces which act on the *pelvis* in rickety children, in whom the bones are at the same time softer and more
loosely

loosely connected than in the natural state, we shall see that the greater part of those forces tend to carry the base of the *sacrum* forward, and the *ossa pubis* backward. Whether the child be standing or sitting, if we attend to the direction of the spinal column, we shall see that the weight of the body must insensibly push the base of the *sacrum* towards the *pubes*; and that it acts in the same manner on the inner parts of the *acetabula*, which serve as a *fulcrum* to the inferior extremities, when the child is standing or walking. The *ossa pubis*, particularly in these latter cases, must be pushed towards the *sacrum*; but in such a manner, however, that their posterior extremities often approach a little nearer to the projection of the base of that bone than their anterior extremities, or the *symphysis*. If the superior *strait* does not constantly present the same figure in deformed *pelves*; if it is sometimes larger on one side than the other; if one of the *acetabula* is nearer to the *sacrum*, while the other approaches less; if the *symphysis* of the *pubes* is removed, in many cases, from a line which would divide the body into two equal parts—it is because the rickets has not equally affected all the bones of the *pelvis*, nor equally hurt all their junctions; and because the attitude which the child takes

in walking, or sitting, may change a little the direction of the compressing powers which I have just mentioned. The weight of the body may also equally hurt the form of the inferior *strait*, but variously, according to the most usual attitude of the child, and the direction taken by the spinal column. For example, if it sits much, the *sacrum* will be more curved, and the *strait* more contracted from before backwards; in this attitude if it inclines habitually to one side, one of the *ischiatric tuberosities* will be thrown inwards, the *os ilium* will be more elevated, &c. The action of the muscles which are attached to the *pelvis*, the pressure of clothes, and that which the arms of the nurse exert on this part, contribute also something to the deformities in question, but much less than the weight of the trunk: whence we see of what importance it is to keep rickety children in bed, and leave them at liberty; instead of obliging them to walk, to sit up, or have them constantly in the arms, as is done almost every where.

93. The deviations of nature do not present fewer varieties in the dimensions of the *pelvis*, than in the *contour* of its *straits*. If the diameter of some, considered from the *pubes* to the middle of the projection of the *sacrum*, is only defective

fective a few lines ; in others the defect is of several inches, so as scarcely to leave one between those two bones. The intermediate degrees are more frequently found than these two extremes ; and the latter of them is never so great in the inferior *strait* as in the superior. I have seen *pelves* in which the distance from the *pubes* to the *sacrum*, superiorly, was but from six to eight lines. I have one in which it is only between three and four lines from the back of the right *acetabulum* to the projection of the *sacrum* ; and in another, which is likewise in my collection, that projection is but fourteen lines distant from the *symphysis* of the *pubes*. There are no examples of the inferior *strait* being ever so contracted : that related by M. *Herbiniaux*, a surgeon of Brussels, Observation VII. being contradicted by the fact itself ; since the woman was in her sixth labour, and he delivered her by means of the *lever*. To assert that, in such a case, the *sinus* formed by the branches of the *ossa pubis* and the *tuberosities* of the *ischia*, was but half an inch wide, is displaying more than ignorance. — See the work of that surgeon, p. 264, &c.

94. If we compare the dimensions of a child's head with those of a well-formed *pelvis*, we shall

see clearly that the latter might have some inches less in its circumference, and yet be large enough for an easy delivery: a common-sized head, when it passes through that canal, presenting a circumference of no more than ten inches and a quarter, or ten and a half, only requires a passage of that size. Proceeding on this principle, we must fix the first degree of narrowness of the *pelvis* at something less than three inches and a half for each diameter, but especially for the smallest, as well of the superior as of the inferior *strait*; and the other degrees, from that, down to the one I mentioned in the preceding paragraph.

95. The difficulty of delivery, all things besides being well disposed, and the child's head of the usual solidity, is in general so much the greater, as the narrowness of the *pelvis* is more considerable. When this vicious conformation leaves an opening of but three inches and a quarter, delivery becomes so much the more tedious and painful, in proportion as the frictions which the child's head must undergo in passing through the *pelvis* are more numerous and strong. If the obstacles are more considerable when the *pelvis* has but three inches in the little diameter,
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yet they are not even then always insurmountable by the natural agents of delivery; and the woman may still be delivered without help, notwithstanding the apparent disproportion which exists between the diameter of the child's head and that of the *pelvis*: the woman may enjoy the same advantage even when the little diameter is but two inches three quarters, as I have seen several times. These natural labours ought only to be considered as exceptions to the rule: the uncommon suppleness of the bones of the child's *cranium* having favoured the lengthening of the head, and the change necessary for its passage.

96. Examples still more extraordinary come to the support of these; and shew us that nature is sometimes able, by new deviations, to prevent the disagreeable consequences which might arise from a deformity of the *pelvis*: a suppleness of the *cranium*, greater still than that I have just mentioned, having procured to some women the good fortune to be delivered without help, and with as much facility as success, although their *pelvis* had but two inches and a half in the little diameter of its entrance. M. Solayres observed, in a case of this kind, that the head was lengthened in such a manner, that its longest diameter

was

was eight inches all but two lines; that which goes from one *parietal* protuberance to the other, being reduced to two inches five or six lines. I have seen similar changes in the form of the head, and the respective length of its diameters, at the instant of birth, where the woman was equally deformed; the great diameter being seven inches, and the transverse thickness of the *cranium* two inches six or seven lines. These children were in good health, and the day after their birth their heads wanted very little of being of the dimensions usual at that time. The history of the section of the *pubes* furnishes us with more convincing proofs of the possibility of a natural delivery, in cases where the *pelvis* has but two inches and an half in the little diameter of the brim. The woman who was cut by M. de Matthiis, the 17th April, 1785, was delivered successfully, and without much difficulty, of her first child nine years before, although her *pelvis* had but that diameter*.

97. When the *pelvis* is so much contracted as to have less than two inches and an half in the little diameter, a child at full time cannot pass it. The Cæsarean operation, the section of the *pubes*, and premature delivery, have been recommended

* See the article on the section of the *pubes*, vol. ii.

in these cases ; but the first is the only one which surgery has authorised : we shall see in the sequel what we ought to think of the second ; and of premature delivery, which the laws proscribe entirely.

98. Though the woman may sometimes be delivered naturally, when the contracted *pelvis* has no more than two inches and an half in the little diameter, it is not always without danger to her and to the child. On one side, the soft parts which line the *pelvis* being subjected to a strong pressure, even to a kind of contusion, inflame, become painful, and are threatened in the sequel with suppuration and gangrene. On the other side, the bones of the child's *cranium* riding one over the other, or being fractured and depressed, compress or wound the brain, which causes it to become plethoric, and produces internal extravasations, which are generally mortal. — See the chapter on the locked head, and the manner of using the forceps, vol. ii.

99. The obstacles which are produced by a deformity of the *pelvis*, and the accidents which result from it, shew themselves sooner or later, according as it is the superior or inferior *strait* which is vitiated. When they are both so, those obstacles manifest themselves as soon as labour

begins; and very often the expulsive powers are so exhausted by exerting themselves against the obstacles produced by the superior *strait*, that the head stops there; or else, having been pushed into the cavity of the *pelvis*, and not being able to advance any farther, remains fixed, till the exhausted, or only weakened, forces of the woman be sufficiently recruited to expel it, unless art come seasonably to her aid. The head cannot clear the first *strait* without lengthening from the *occiput* to the chin, and diminishing in thickness from one *parietal* protuberance to the other; and without the *parietal* bones crossing each other at their superior edges, as well as the other bones of the *cranium*; nor without producing a tumefaction in that part of the teguments of the *cranium* which answers to the void of the *pelvis*, and an *engorgement* of the brain; and, lastly, without strongly compressing and bruising the soft parts which line the *strait*. Being got into the cavity of the *pelvis*, and finding itself in a larger space than the *strait* which it had just cleared, the child's head is restored more or less to its natural state, according as it sojourns there a longer or a shorter time; and departs in the same degree from the form it had acquired in the first period, and which is still

necessary to enable it to pass the inferior *strait*. The symptoms which had manifested themselves, as I may say, with the first pains, sometimes disappear, more or less, during the stay of the head in the excavation; but re-appear, and increase anew, when the labour comes on again with force.

100. When the superior *strait* alone is contracted, the child's head at first advances with great difficulty; but as soon as the *parietal* protuberances have cleared the *strait*, the other parts of the *pelvis* being relatively or absolutely larger, the head passes them with so much ease, that frequently a few pains suffice to terminate the delivery.

101. We observe the contrary when the inferior *strait* is vitiated, if the first is of the usual size. The head descends easily into the lower part of the *pelvis*, but can proceed no farther till it overcome the obstacles which obstruct its course, and render it as difficult as laborious. The symptoms which I have just mentioned in paragraphs 98 and 99, manifest themselves later in this than in the preceding case.

102. The accoucheur who has not yet by long practice enabled himself to form a just estimate of the powers of nature, may easily deceive himself

himself in these cases; and, in the first, judge a delivery to be impossible which is ready to terminate; and, in the second, declare that to be easy which is just going to be opposed by difficulties that art alone can surmount, or which at least render it extremely tedious and painful. I shall not here collect observations to give more force to these truths: authors might have furnished a great number of them, if they had mentioned all the errors they have committed in such cases. More than forty persons were witnesses to the disagreeable consequences of a mistake of this kind, in a woman whose *pelvis* I have long had by me. The operator having pronounced that the woman would be speedily delivered, on account of the facility with which the child's head had engaged with the first pains—and attributing the obstacles which soon after obstructed its passage to another cause, and not to the narrowness of the inferior *strait*, which had not been noticed—waited two days in perfect security; and then, by a more blind temerity than the former, used the crotchet on a child whose life might by other means have been preserved. The superior *strait* of the *pelvis*, divested of all its coverings, presented a circumference of fourteen inches, in a circular form, while the inferior

strait had but nine; the distance from the point of the *sacrum* to the *symphysis* of the *pubes*, as well as the interval between the *ischiatric tuberosities*, was but three inches. The cavity of this *pelvis* diminished insensibly in breadth from one *strait* to the other, and was as regular as possible in its *contour*.

103. The middle part, or excavation, of the *pelvis*, is much feldomer defective than the *straits*; and, when it exists, must arise from some *exostosis*, or from the *sacrum*'s describing a *straight* line in its anterior part, instead of being curved as usual. This defect in the cavity can produce no other effects than those which have just been described.

A straight and flat form of the *sacrum*, in general, produces fewer obstacles to delivery than the too great curve of that bone. The former fault commonly only affects the cavity of the *pelvis*; which cannot hinder the passage of the child, if the canal be otherwise well disposed: whereas the latter, or too great curve of the *sacrum*, generally injures the two *straits*, and contracts them from before backward, at the same time that it diminishes the depth of the *pelvis* posteriorly, and the respective height of the arch of the *pubes*. The child's head, after
having

having with difficulty cleared the first *strait*, in these cases, cannot pass the other; because it is stopped in its course by the inferior part of the *sacrum*, before the *occiput* is low enough to engage under the arch.

104. A too great length in the *symphysis* of the *pubes*, a want of elevation or breadth in the arch of those bones, the length and wrong direction of the *ischiatric* spines, as well as a consolidation of the *coccix* with the point of the *sacrum*, may also render labour difficult, in the same manner as is done by the excessive curve and shortness of the *sacrum*. Besides that these latter faults are very rare, if we except the consolidation of the *coccix*, I must observe that they are scarcely ever met with alone, and that they are generally the consequence of a bad conformation of the rest of the *pelvis*.

105. If the intimate consolidation of the three pieces which constitute the *coccix*, or of the *coccix* with the *sacrum*, be more common than the other faults, yet it cannot obstruct delivery so often as has been thought; and, if it sometimes does, it is only in women who have also a narrow *pelvis*. Those who have assured us that, in all cases, the point of the *coccix* is pushed back half an inch, or even an inch, by the

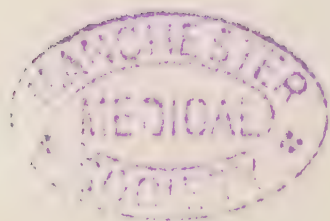
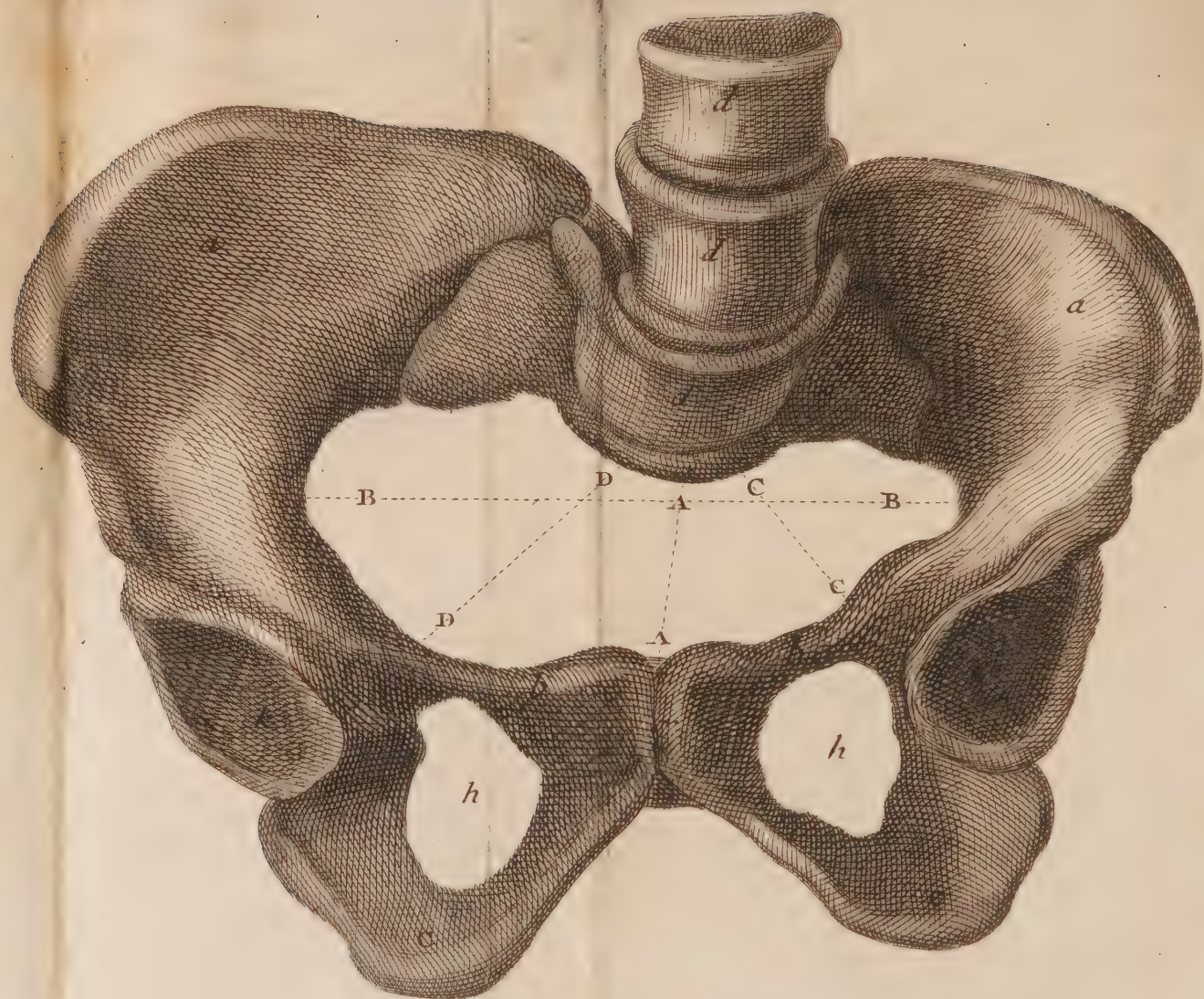
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child's head, knew not the relation between the dimensions of that head, and those of the inferior *strait*, in most women; for they might have seen that the diameter, measured from the extremity of that appendix to the inferior edge of the *symphysis* of the *pubes*, was absolutely greater than that which the head presents in that direction, when it disengages from the *pelvis*.—See the mechanism of natural labour.

We cannot then recommend the precept laid down by some, on account of the consolidation of the *coccix* with the *sacrum**, without exposing the greater part of those who practise Midwifery to the abuse of it; for generally this consolidation has been blamed for what was merely the effect of the resistance of the external parts.

* This precept advises pushing back the *coccix*, when the head, though low down, cannot disengage itself easily.



Explanation of the Fourth Plate.

THIS figure represents a deformed *pelvis*, of which all the parts are reduced to half their natural size.

a, a, The *ossa ilia*.

b, b, The *ossa pubis*.

c, c, The *ossa ischia*.

d, d, d, The last *lumbar vertebræ*.

e, The projection of the *sacrum*.

f, f, The *sacro-iliac symphyses*.

g, The *symphysis* of the *pubes*.

h, h, The *foramina ovalia*.

i, i, The branches of the *ossa pubis* and *ischia*, which form the anterior arch of the *pelvis*.

k, k, The *acetabula*.

The lines indicate the diameters of the superior *strait* of this *pelvis*.

A, A, The *antero-postero* diameter; its natural length is fourteen or fifteen lines.

B, B, The transverse diameter; its natural length is four inches ten lines.

C, C, The distance from the projection of the *sacrum*, to that point of the margin which answers to the left *acetabulum*, thirteen lines.

D, D,

D, D, The distance from the same point of the *sacrum*, to that of the margin which answers to the right *acetabulum*, twenty lines.

I have another *pelvis*, which has an opening of between three and four lines only in the direction of this last line, and an inch and an half from the middle of the projection of the *sacrum* to the *symphysis* of the *pubes*.

The inferior *strait* in both these *pelves* is very large.

Explanation of the Fifth Plate.

THIS figure represents a deformed *pelvis*, in which the parts are reduced to half their natural size.

a, a, The *ossa ilia*.

b, b, The *ossa pubis*.

c, c, The *ossa ischia*.

d, d, d, The last *lumbar vertebra*.

e, The projection of the *sacrum*.

f, f, The *sacro-iliac symphyses*.

g, The *symphysis* of the *pubes*.

h, h, The *foramina ovalia*, seen obliquely.

i, i, The arch of the *pubes*, seen in the same manner.

k, k, The *acetabula*.

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The lines indicate the different dimensions of the superior *strait*.

A, A, From the *pubes* to the projection of the *sacrum*, in the natural state of this *pelvis*, two inches two lines.

B, B, The transverse diameter, three inches eight lines.

C, C, From the middle and left side of the projection of the *sacrum*, to that part of the margin which answers to the *acetabulum* of the same side, between six and seven lines.

D, D, From the middle and right side of the projection of the *sacrum*, to that part of the margin which answers to the right *acetabulum*, one inch two lines.

This *pelvis* was taken from the cabinet of M. *Riel*. The subject was a woman of twenty-seven years.

SECTION XI.

Of the Soft Parts connected with the Pelvis.

106. THE accoucheur would have but an imperfect knowledge of the *pelvis*, if, after having studied it in the skeleton, he should not consider it in conjunction with the soft parts which surround it on all sides; since some of these latter cause great changes in its form and dimensions; and it is only by a knowledge of the situation, the connection, and uses of others, the change of place, and the constraint or compression which they suffer during pregnancy, that he can explain the greater part of the phenomena which occur in that period, and during labour.

107. The *pelvis*, making part of the abdominal cavity, is bounded superiorly by the *diaphragm*, which separates that cavity from the breast; behind, by the spinal column, the *quadrati* muscles, and others; before, and at the sides, by the abdominal muscles, &c. These latter have too much influence on the mechanism of labour, for us not to take notice, at least, of their principal attachments, and the relation which they have to each other.

108. Of

108. Of these muscles, which are ten in number, eight are attached to the breast, and to the superior edge of the *pelvis*; that is to say, the oblique, the transverse, and the *recti*. The two oblique and the transverse, on each side, extend from the last true ribs, and from all the false ones, to the *cristæ* of the *ossa innominata*, forming three distinct planes by the direction of their fibres: those of the external plane descending more or less obliquely from behind forwards; those of the second ascending from before backwards; and the fibres of the third going transversely, in the manner of a girdle. Each of these muscles terminates in a broad *aponeurosis* at its anterior part. The *aponeurosis* of the external oblique, passing from the anterior superior spine of the *ilium* to the angle of the *pubes*, forms *Poupart's* ligament, and the inguinal ring; that of the internal oblique divides into two layers, one of which unites itself intimately to the *aponeurosis* of the former, and the other to that of the transverse muscle. In the sheath formed by this partition are found the *recti* muscles, at least the superior two-thirds of their length. These muscles descend in parallel lines from the anterior and inferior part of the breast to the anterior extremity of the body of the *ossa pubis*.
They

They are thinner and broader above than below. Their inferior extremity is applied immediately to the *peritoneum*, and is covered externally by the pyramidal muscles, which ascend from the angles of the *ossa pubis* to the *linea alba*.

109. The *linea alba* is the space which separates the *recti* muscles; it is a kind of band, formed by the junction of the *aponeuroses* of the oblique and transverse muscles of each side; but whose fibres are so crossed and interwoven, that those of the external oblique muscle of the right side, for example, seem continued with those of the internal oblique of the left side, &c. This band is broader above the *umbilicus* than below, and extends from the bottom of the *sternum* to the top of the *symphysis* of the *pubes*. Its breadth constantly augments in the course of pregnancy, in proportion as the volume of the *abdomen* is developed; towards the end of it, the *recti* muscles are considerably separated from each other, especially at the height of the *umbilicus*; and sometimes the umbilical ring is singularly open. We observe also that the *linea alba* is then very thin; and that its separated fibres leave in many places considerable meshes, which have sometimes given birth to certain *hernias*. The abdominal muscles, independently of their
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uses relative to the motions of the breast on the *pelvis*, and of the *pelvis* on the breast, exert their action on the *viscera* of the *abdomen*, and especially on the *uterus* in time of labour, to which that action singularly contributes.

110. In order to mark the place which nature has designed to each of the *viscera* of the *abdomen*, of which I shall here only enumerate the names, it is proper to recollect the names of the different regions of that cavity. We reckon three principal ones, *viz.* one superior, called *epigastric*; one middle, the *umbilical*; and one inferior, the *hypogastric*: we may estimate the extent of them by drawing two transverse lines from one side of the *abdomen* to the other, at two fingers breadth above and below the *umbilicus*. Each of these regions is subdivided into three others; one middle, which is called the principal region; and two lateral, known by the names of *hypocondres*, lumbar and iliac regions.

111. The *stomach*, the *liver*, the *spleen*, the *duodenum*, and the *pancreas*, occupy the first of these principal regions; the greater part of the small intestines, the *colon*, almost the whole of the *omentum*, the *kidneys*, and their dependencies, are situated in the second. The other contains the *cæcum*; a portion of the *ilion* and of the *colon*;
some

some of the parts of generation ; and others which, having a more immediate relation to the *pelvis*, require a particular detail.

112. We find two muscles at each side of the *pelvis* internally ; the *iliacus* and the *psoas*. The former, whose fibres are as it were radiated, covers the *iliac fossa* ; and the other descends from the lateral part of the lumbar column, over the side of the superior *strait*, and above the *acetabulum*, where they join and unite themselves strictly, to be inserted together into the little *trochanter* : the *psoas*, in this course, narrows the entrance of the *pelvis* a little transversely, as I have already observed. We sometimes meet with a third muscle, *psoas parvus* ; it lies along the internal edge of the *psoas*, and is terminated by a flat *tendon* at the posterior extremity of the eminence, called *ilio-pectineus*.

113. Behind, and in the substance of the *psoæ* muscles, are found the nerves which form the *obturator* and the *crural*, as well as other branches furnished by the three first pair of *lumbar* nerves, especially by the first ; which, following a different course, are lost in the teguments of the groins, and parts adjacent. I think it is to the distension and stretching which these subaltern branches and their ramifications undergo,

dergo, by the augmentation of the volume of the belly, that we are to attribute the troublesome pains which women feel about the *pubes*, in the groins, and in the small of the back, in the latter periods of gestation; especially when they are standing still, or kneeling, &c. So also we must attribute to the compression which the *crural* and *obturator* nerves suffer before their exit from the *abdomen*, that weakness of the inferior extremities, which makes most pregnant women so apt to fall on their knees, or the breech, and makes their gait so unsteady; for these accidents cannot depend entirely on the alteration of the center of gravity during pregnancy. We know that the *obturator* and the *crural* nerves are formed by the union of several cords which are derived from the second, third, and fourth pair of *lumbar* nerves; that the *obturator* goes out of the *pelvis* at the posterior and superior part of the *foramen ovale*, to be distributed to the muscles of the inside of the thigh; that the *crural* passes out under the *ligamentum Fallopii*, where it divides into a great number of branches, some of which go as far as the foot.

114. Before the last *lumbar vertebra*, and frequently before the fourth, we remark the *bifurcation* of the *aorta*, and of the *vena cava* infe-

rior; and soon after the division of each of these branches, known by the name of primitive iliac arteries and veins, into two others. One of these latter goes to the inferior extremities, along the internal edge of the *psoas* muscle; and the second descends into the *pelvis*, to rise again at the side of the bladder and *umbilicus*, forming a curve from which arise the *obturator* vessels, the *glutei*, the *sciatica*, and the *pudica communia*. The first of the two branches of the primitive *iliac* arteries, is called the external *iliac*, or *crural*; the second, the internal *iliac*, or *hypogastric*. The veins are distinguished by the same names.

115. The *rectum* is not the part least remarkable among those I propose to mention. Its situation at the left side of the projection of the *sacrum*, and that of the Roman S of the *colon*, of which it is the continuation, as well as the volume which it acquires by the accumulation and retention of the excrements, produce effects which have often been attributed to causes which had nothing to do with them; such as a lateral obliquity of the *uterus*, &c. This intestine is bound to the *sacrum* by a very loose cellular tissue, in which we remark the *sacral* and *hæmorrhoidal* vessels, the extremity of the great sympathetic

sympathetic nerves, and especially the *sacral* nerves.

116. These latter, to the number of five pair, pass out of the canal of the *os sacrum*, through the holes which have already been remarked in its anterior face. The three first pairs, with a cord from the two last *lumbares*, are almost entirely employed in forming the *sciatic* nerves, which are distributed through the whole extent of the inferior extremities, after passing out of the *pelvis* at the *ischiatric* notch. The fourth and fifth pairs go only to the parts within the *pelvis*, to some of the muscles which surround it, and to the external parts of generation.

117. It is to the compression which the child's head, on certain occasions, exerts on these nervous cords at their exit from the *sacral* holes, that we must attribute the painful cramps, and the convulsive trembling, of the inferior extremities, which sometimes so cruelly torment women in time of labour; as well as the sensation of numbness and weakness which they often feel in those parts.

118. At the sides of the *pelvis*, and behind, are found the two pyramidal muscles of the thighs, the *sacro-ischiatic* ligaments, and the *ischio-coccygei* muscles. A little forward are the

levator ani, which embrace the neck of the bladder by their anterior edge, and the extremity of the *rectum* by their lower parts. Lastly we find here the internal *obturator* muscles.

119. Behind the *os pubis* is the urinary bladder, with the canal of the *urethra*. Towards the latter end of gestation it is almost always found entirely above those bones; and the *urethra* then becomes parallel to their *symphysis*.

120. In the middle of the *pelvis* is situated the *uterus* and its dependencies, of which I shall speak presently; and the whole is covered by the *peritonæum*.

121. A great number of muscles, of which some belong to the thighs and legs, others to the back, loins, and arms, are attached to the outside of the *pelvis*. These muscles, and much more those of the *abdomen*, by acting on the *pelvis*, and drawing it sometimes to one side and sometimes to the other, according to circumstances, may change the direction of its axis a little, relative to that of the body; and may in another manner also affect the mechanism of delivery.

122. The teguments and the cellular membrane, more or less loaded with fat, according to the lustiness of the woman, form a common
covering

covering to the hard and soft parts which we have comprised under the name of *pelvis*. But this covering is not equally thick in all parts, because the *subcutaneous* cellular membrane is closer in some parts than in others, and cannot admit there the same quantity of adipose juices. We observe, for example, that the cellular membrane is always pretty thin behind, in the places which answer to the spiny *tubercles* of the false *vertebræ* of the *sacrum*, whatever may be the lustiness of the subject. We know that the teguments present several large openings on the outside of the *pelvis*, as the *anus* and the *vulva*, as well as plaits in form of furrows at the groins and under the *nates*. These plaits are more or less profound or superficial, according as the thighs are bent or extended. In an extreme flexion of these extremities, the plaits of the *nates* are effaced; and if we then separate the knees, as most women do when the head is ready to be delivered, the *perinæum* becomes extremely tight; which renders the developement of that part more difficult, as well as that of the *vulva*; and retards delivery, at the same time exposing the *fourchette* and the *perinæum* itself to be more torn. We see, according to this observation, that we ought at that moment to

keep the woman's thighs, at most, moderately bent and separated, &c.

S E C T I O N XII.

Of the Examination necessary to discover whether the Pelvis is well or ill formed.

123. No one can be acquainted with certain fundamental truths of the art of Midwifery, without knowing all the importance of this examination : but its difficulties are only perceived by those obliged to make these researches ; and a frequent exercise on the dead body can alone smoothen a part of the obstacles we meet with in it.

124. If accoucheurs had applied themselves more to these examinations ; if they had earnestly demonstrated all the necessity of it, with respect deformed women ; and if those women had submitted to it before they engaged in marriage, we should probably still have been ignorant of those sad resources of our art, which have had so many victims, for a few mothers and children which they have saved from certain destruction. What
woman

woman would have purchased the title of mother so dear, if she had been assured that in becoming pregnant she could have no resource but in the Cæsarean operation, or in the section of the *pubes*? what woman would have consented to the sacrifice of her child, to save her from these operations? and who would have wished to taste the sweets of hymen at that price?

125. In whatever point of view we place this object, it will appear equally important: whether the question be of a young woman, whose external deformity gives occasion to fear concerning the state of the *pelvis*; or of a married woman ready to lie in, or whose labour is begun—the accoucheur becomes, in some sort, the arbiter of her destiny; and his decision may affect the life of one or of several individuals. The more distressing the consequences of such an examination may prove, the more care and skill we ought to exert in making it. All who practise the art of Midwifery have not the knowledge necessary to estimate the degree of defect in the form and dimensions of the *pelvis*. It cannot be determined by inspecting the spinal column; nor by the irregularity of the inferior extremities, and the gait of the woman; nor by the time at which the deformities of all these

parts were manifested. On one side, the cause of these deformities does not always affect the form of the *pelvis* so as to render delivery impossible, or even difficult ; and, on the other side, we have seen these deformities manifest themselves in infancy, disappear in youth, and the *pelvis* alone retain the impressions of the rickets which had produced them : so that many crooked women may be delivered naturally ; while others, who enjoy the finest external proportions, cannot have the same good fortune, the narrowness of the *pelvis* producing obstacles insurmountable by the common agents of delivery. There is no rock on which these external appearances, favourable or unfavourable, have not thrown the unskilful practitioner. His security, in some cases where he had persuaded himself that the *pelvis* was well formed, has suffered some women and children to perish in the continued exertion of impotent efforts, who could not possibly have been saved but by the forceps, or the Cæsarean operation ; while the disadvantageous opinion which he had conceived of that cavity, in other cases, has led him to employ those means in circumstances that only required a little dexterity on his part. It is not only the forceps which have been abused in these latter cases, but the Cæsarean operation, and

and much more still the section of the *pubes*: alarming truths, which it gives me pain to mention.—A few years ago I preserved a woman from the Cæsarean operation, the diameter of whose *pelvis* had been estimated at only one inch and a quarter by the accoucheur she had employed: we waited four hours for the favourable moment to operate; the apparatus was prepared; the woman was ready to place herself on the couch; twelve or fifteen persons, as well physicians as surgeons, were going to be witnesses of this afflicting scene; when, touching the woman for the first time, I declared strenuously that she would be delivered naturally, and without difficulty; as actually happened two hours afterwards, and the child was strong and healthy.

126. The consideration of the external form of the *pelvis* may be very useful to us in the examination which I am going to describe: for the negative signs of a good conformation are so many indications of a bad one; and both the one and the other have, besides, external marks which enable us to judge of the cavity and internal form of the *pelvis*. The roundness of the hips; their equality, as well in height as in breadth; the convexity of the *pubes*; the superficial depression

pression of the superior and posterior part of the *sacrum*; an extent of four or five inches from the center of that depression to the extremity of the *coccix*; a thickness of seven or eight inches, in women moderately lusty, from the point of the *spiny tubercle* of the last *lumbar vertebra* to the middle of the *mons veneris*; and a distance of eight or nine inches between the anterior superior *spines* of the *ossa ilia*, characterize a good conformation. An irregularity of the hips, whether in their roundness or elevation; a distance much smaller than that which I have assigned between the superior anterior *spines* of the *ossa ilia*; a too high or too flat form of the *pubes*; too deep a fall in the small of the back; a great convexity of the *sacrum* behind; an inflection of the *lumbar column* to one side or the other, &c. denote a bad conformation.

127. The superior *strait* is contracted between the fore and back parts, whenever the *pubes* is less salient than common, and the posterior and superior parts of the *sacrum* more sunk in. The inferior *strait* is also contracted in that direction, when the point of the *sacrum* and the *coccix* are carried inwards; and it is larger, when that appendix is thrown backwards or outwards.

128. When the first of these *straits* is vitiated
transversely,

transversely, the region of the *pubes* is salient, instead of being flattened, as in the preceding case; the anterior part of the *pelvis* forms an obtuse angle, and not that circular figure which characterizes a good conformation; and often one of the groins appears more sunk in than the other. If it is more difficult to form a judgment of a narrowness which affects but one side of this *strait*, so also it gives less obstruction to delivery than that which I have just mentioned.

129. But these general notions are still insufficient, and cannot enable us to determine the degree of opening which a deformed *pelvis* presents interiorly. However experienced we may be, the application of the hands externally will never inform us sufficiently to determine the choice of the means proper to be used for terminating the delivery in difficult cases. If we cannot any other way acquire a knowledge of all the diameters with a mathematical precision, at least we come near enough to prevent our committing any capital mistakes. It is easy, especially, to determine the length of that diameter of the superior *strait* which goes from the *pubes* to the *sacrum*, the only one which is generally defective respecting delivery. Many instruments are used for measuring it, which are so many kinds of compasses,

compasses, some of which are developed within the *pelvis*, and some without; I prefer one of these latter, which I call *compas d'épaisseur* (calipers), not only because its application is more easy, but also because there is nothing in it painful or fatiguing to the woman; and because it may be applied at all times, and on all kinds of subjects; and because the result of it has appeared to me more certain.

130. To determine how much the superior *strait* is defective in the aforesaid diameter, and measure it by means of these compasses, we take the thickness of the woman from the middle of the *mons veneris* to the center of the depression of the base of the *sacrum* posteriorly, by applying one of the points of the instrument before, against the *symphysis* of the *pubes*; and the other behind, a little under the spine of the last *lumbar vertebra**; and deduct three inches from that thickness, in women that are thin, for the base of the *sacrum* and the anterior extremities of the *ossa pubis*: the thickness of these latter being at most but six lines, and that of the base of the *sacrum* two inches and an half; and so constantly so, that I have not found a difference of a line in about five-and-thirty *pelves*, distorted

* See the Sixth Plate.

and contracted in all manner of ways, and in all possible degrees. This subtraction of three inches from the external thickness of the *pelvis*, in the said direction, is also sufficient where the lustiness is moderate; and we may add one or two lines more when it is excessive, because the fat which forms the *mons veneris* easily shrinks under the lenticular extremity of the leg of the compasses. The result of this procedure is so exact, that the *pelvis*, measured with the common compasses after opening the body, was not above a line over or under my estimation in any one of my experiments. A greater precision, if we could obtain it, would be useless; since the choice of the most proper methods for terminating the delivery in a given case, cannot depend on a line more or less in the diameter of the *pelvis*. According to these *data*, the knowledge of this diameter is easily obtained. It is four inches, when the external thickness of the *pelvis* measures seven; it is but three, when the latter only measures six; and but two, when it does not exceed five, &c. I suppose the woman to be thin, as most of those are who have been rickety.

131. The compasses whose branches are developed within the *pelvis*, have often presented a result

result not very exact ; and more than once the error has been of several lines over or under the product they had given : as well because it is difficult to keep one of the branches on the center of the projection of the base of the *sacrum*, while the other is placed behind the *pubes* ; as because the soft parts which line the *pelvis* obstruct their developement : their use, besides, is always accompanied with pain, which excites the action of those same parts. We cannot make use of them in young girls, concerning whom their doubtful parents may consult us before marriage ; nor even in married women, except in time of labour.

132. The fore finger likewise introduced into the *vagina*, and properly directed, may equally serve to make known the length of the little diameter of the superior *strait* ; and the knowledge of it is the more easy to obtain, as the *pelvis* is more contracted. We advance the extremity of this finger to the middle of the most projecting part of the base of the *sacrum*, near its junction with the body of the last *lumbar vertebra* ; and, by raising the wrist, we apply the radial edge of the same finger to the inferior edge of the *symphysis* of the *pubes*. We mark on that finger, with the nail of the fore finger of the other hand, the point
4 immediately

immediately under the *symphysis*; then, withdrawing it from the *vagina*, we measure the length from that point to its extremity. This measure, which is that of the line which descends obliquely from the middle of the projection of the *sacrum* to the inferior edge of the *symphysis* of the *pubes*, is commonly half an inch longer than the diameter of the superior *strait*, measured from the same point of the *sacrum* to the top of the said *symphysis*. An accoucheur well versed in these examinations, cannot be deceived by this method above a line or two, at most, whatever may be the form or the degree of opening in the *pelvis*; which cannot lead him into the commission of any capital faults in practice.

133. We cannot come near the same precision in the estimation of the other diameters, except that of the inferior *strait* which goes from the *pubes* to the *coccix*; but we may estimate them well enough not to be grossly deceived in the choice of the methods to be employed for terminating the delivery. Though the external dimensions of the *pelvis* cannot demonstrate the transverse diameter of the superior *strait*, and though the finger introduced into the
vagina

vagina cannot measure that diameter, we may judge of its length with respect to delivery by that of the former. When that which goes from the *pubes* to the *sacrum* is so small that great obstacles result from it, it is excessively rare for the other to be so at the same time; and more rare still for the latter to be defective when the former is of the requisite length. If we measure the transverse diameter from one *iliac* notch to the other, that is to say, between the two most distant points of the superior *strait*, we shall never find it less than four inches, whatever may be the length of the diameter which goes from before backward; but this transverse line, the most extensive which we can find in the superior *strait*, must not be looked on as the diameter of that *strait*. Far from passing through the center of that opening, we observe that it in a manner touches the *sacrum*, in the greater part of deformed *pelves*, and that in many it passes under the projection of the base of that bone. If the transverse diameter were to be measured from one side of the superior *strait* to the other, at equal distances from the projection of the *sacrum* and the *symphysis* of the *pubes*, it would be always shorter

shorter than what I have assigned, but nevertheless always greater than the *antero-posterior* diameter.

134. We discover the extent of the diameters of the inferior *strait*, within a very trifle, by feeling externally till we can clearly distinguish the *ischiatric tuberosities*, the point of the *cocci*, and the inferior edge of the *symphysis* of the *pubes*. Though it is easy to distinguish these two latter points while the subject is standing, and to judge of their distance, it is not so with the former, on account of the great number of muscles which are attached to them, and the direction of those muscles: but we discover the *tuberosities* in question, we render them somewhat more salient, and evidently more palpable, by giving the thighs of the subject an extreme flexion. If then we want to estimate the distance from one of these *tuberosities* to the other, the woman must be sitting, or, as it is vulgarly called, squat; that is to say, in such an attitude that the legs and thighs may be bent. It is by the distance between the fingers which touch the *ischiatric tuberosities*, that we judge of that between them; but the diameter which we propose to measure thus, is always two or three lines shorter than

the external measurement; and sometimes five or six lines, when the bones are very thick.

135. As often as the condition of the subject to be examined permits us to pass the finger into the *vagina*, we ought to do it; we might even introduce the whole hand into it, if necessary, and circumstances were sufficiently favourable to permit it; as, for example, in time of labour. This procedure conducts us more surely still to the knowledge of the *pelvis*, since it enables us to discover things which cannot be perceived by simply examining the outside of this part; such as *exostoses*, which sometimes affect it, &c. By thus examining the inside of this canal, when by long practice we have acquired the habit of it, we may discover the length of its different diameters within a few lines; and especially that of the small diameter of the superior *strait*, as I have already explained. In the same manner we may measure the distance of the *coccix* from the *symphysis* of the *pubes*, by keeping the radial edge of the finger against the inferior edge of the latter, and its extremity against the point of the former, which we are to push back as much as possible.

136. The depth of the *pelvis* behind may be
measured

measured by the length of the *sacrum*; at the sides, by taking half the height of the *ossa ilia* from the anterior superior *spine* to the *tuberosity* of the *ischium*; and before, by the extent of the *symphysis* of the *pubes*.

137. It is not more difficult to find the elevation or height of the arch of the *pubes*, by deducting the length of the *symphysis* from the depth of the sides of the *pelvis*. For example, if the former is eighteen lines, and the lateral depth of the *pelvis* is three inches and an half, the height of the arch will be two inches. Lastly, the breadth of this arch may be known by means of the finger applied transversely in the *vagina*; or by feeling externally at the sides, and along the *labia pudendi*. The distance between the *tuberosities* of the *ischia* also demonstrates this breadth very well.

Explanation of the Sixth Plate.

THIS plate represents a vertical section of the *pelvis*, reduced to about half its natural dimensions; with the *pelvi-meter* of M. *Coutonli*, and my *calipers*.

FIG. I. A, A, A, A, The four last *lumbar vertebræ*.

B, B, B, The *os sacrum*.

C, C, The *coccix*.

d, d, Surface resulting from the section of the *symphysis* of the *pubes*.

E, The left *iliac fossa*.

F, The left side of the superior *strait*.

G, The *sacro-ischiatic* ligament.

H, The *tuberosity* of the *ischium*.

i, i, The entrance of the *vagina*.

K, One of the *labia pudendi*.

L, The *anus*.

M, The *mons veneris*.

N, The left *natis*.

FIG. II. The *calipers* which I use for measuring the *antero-posterior* diameter of the superior *strait*.

a, a, The branches of the *calipers*.

B, The

B, The hinge which unites the two branches.

c, c, Lenticular buttons which terminate the branches.

d, A graduated scale, nine inches long, intended to demonstrate the thickness of the body comprised between the branches *.

e, The place where the scale is united by a kind of hinge.

f, A little screw, with a flat head, intended to fix the scale, while we calculate the thickness of the body comprised between the branches.

FIG. III. The *pelvi-meter* of M. *Coutonli*, developed in the *pelvis*.

A, A, The first branch, whose square, B, is applied to the projection of the *sacrum*.

C, C, A kind of hooks, intended to keep the first branch in its place while we introduce and develop the second.

This first branch has a dove-tailed groove, in which the body of the second branch is lodged and moved.

d, d, The second branch of the instrument,

* This scale is contained in a deep groove cut lengthwise in the branch of the *calipers*, from the letter *e* to the hinge B; and passes through a mortise made in the other branch, under the letter *f*.

whose square, e, is placed against the *symphysis* of the *pubes*.

F, A scale, four inches long, graduated on the branch d, d, and intended to shew the degree of opening from the *pubes* to the *sacrum*.

Note, We have not confined ourselves scrupulously to the geometrical proportions of these two instruments; but we have reduced them here, as well as the *pelvis*, to about half their natural size.

ARTICLE II.

Of the Parts of the Woman concerned in Generation and Delivery.

138. AMONG the parts of the woman concerned in generation and delivery, some may be seen without any dissection; and others, profoundly hidden, cannot be discovered but by that means; which has caused them to be distinguished into External and Internal.

SECTION I.

Of the External Parts of Generation.

139. THESE parts are the *mons veneris*, the *labia pudendi*, the *sinus* called the *vulva*, the *nymphæ*, the *clitoris*, the *urethra*, the orifice of the *vagina*, the *hymen* in virgins, the *carunculæ myrtiformes* in women, the *fourchette*, and the *fossa navicularis*.—The internal parts are the *uterus* and its dependencies; that is to say, the *ligaments*, the *fallopian tubes*, the *ovaria*, and the *vagina*.

140. The *mons veneris* is that region covered with hair, situated at the bottom of the *hypogastrium*, and before the *pelvis*: its elevation or rotundity is more or less, according to the form of the superior *strait*, and the lustiness of the woman. The teguments below this part divide into two columns, which go in parallel lines towards the *anus*, and form the *labia pudendi*.

141. These are firmer and thicker in virgins and young women, than in others. Their internal face, always moist, is of a bright red in the former; and, on the contrary, pale in those who have had children. Their external face is covered with hair at the age of puberty. We find in their substance some layers of cellular membrane, which seem to descend from the branches of the arch of the *pubes*; there is usually little fat in them, but a great many *sebaceous glands*. Pregnancy causes some changes in them, often favourable to delivery; and sometimes others, which obstruct it, and in certain cases require chirurgical help; such as œdematous swellings, varicous tumours, abscesses, &c.

142. The *labia pudendi*, in their natural state, have only a very narrow chink between them; but, when we separate them, we discover a

sinus

sinus called the *vulva*, in which are found the other external parts of generation.

143. The most apparent are the *nymphæ*: often in young girls, and especially at the time of birth, they extend a little beyond the *labia*. They resemble pretty much, in figure, size, and colour, the *cristæ* which we see under the throats of certain *fowls*. Age, and repeated deliveries, produce the same changes in them as in the *labia*, their structure being nearly the same. The *nymphæ* are narrow, and very close, at their origin, but they enlarge and separate as they go backward; so that they represent, as some anatomists have said, the legs of a pair of compasses moderately extended. In some women they relax, elongate, and become pendant, so as to extend far without the *labia*; the friction which they then undergo, hardens and ulcerates them, which has many times made their extirpation necessary. If their principal use is to direct the urine downwards when the woman discharges it, we cannot deny that they assist in augmenting the entrance of the *vagina*, when the head passes it; at which time we generally see them disappear, either partly or entirely.

144. Above the *nymphæ* we perceive a fold, a little more than semilunar, formed by the internal

ternal membrane of the *labia*, and which serves as a prepuce to a *tubercle* which disengages itself from it spontaneously in the living woman, if we irritate it ever so little in seeking it. This *tubercle* is commonly called the *clitoris*, though it is only the extremity of it. It is of so exquisite a sensibility, that it is looked upon as the seat of venereal pleasures. Sometimes surgeons have been obliged to extirpate it from children consumed by a *marasmus*, and ready to sink under the evacuations excited by the continual mechanical irritation of this part; as also from some women, but with different views. The portion of the *clitoris* which is apparent, has little length or thickness, except in some few women, in whom it may equal the end of the little finger, the thumb, or even the *penis* of a man. This body rises from the anterior edge of the branch of each *os pubis*, by two roots or legs, known by the name of *corpora cavernosa*. They are nearly cylindrical, and covered, through almost their whole length, by the extremities of the *erector* or *ischio-cavernosi* muscles, which belong to the *clitoris*; they join and unite before the inferior edge of the *symphysis* of the *pubes*, to form the body in question. The *clitoris* is attached to the anterior part of
the

the *symphysis* by a ligament which is called *suspensor*; and it has vessels of every kind. Being cavernous, and enjoying an excessive sensibility, it swells and stiffens as soon as it is lightly touched.

145. On separating the *nymphæ* we discover the urinary passage. This opening, which is longer than it is broad, is surrounded by a little pad, in the environs of which we see several little *lacunæ*, which discharge in this place the liquor secreted by the glands to which they belong. The canal of the *urethra*, of which this opening forms the extremity, is shorter in women than in men. If its structure differs little from that of the male, it is not so in respect to its direction, which also undergoes some change during gestation,

146. This canal, which is about an inch long, but wider than in men, passes under the *symphysis* of the *pubes*, rising obliquely backward to the bladder. Towards the latter end of gestation, it rises almost perpendicularly behind that *symphysis*, with which it becomes parallel; and sometimes it is even curved over the *os pubis*, the bladder being then thrown forward by the *uterus*: which makes it not easy to penetrate it, to evacuate the urine when necessary, unless we use a catheter more curved than that which is usually

usually employed in women. The canal of the *urethra* cannot suffer this change of direction, without lengthening more or less, and contracting a little; nor without its external orifice appearing more sunk in, and, as it were, out of its place. We must sometimes, in the latter periods, search for it even below the anterior part of the *vagina*, and in some measure behind the inferior edge of the *symphysis* of the *pubes*. The consequences of a laborious delivery, and even of a natural one, sometimes so change the relation of all these parts, that the urinary passage is found in the afore-mentioned part; and as it is not exceedingly rare for the urine to flow involuntarily for a few days, or even longer, some unskilful accoucheurs have taken that opening for a *fistula* of the bladder.

147. Below the urinary passage is found the entrance of the *vagina*. This opening, naturally closer in virgins than in women, is bordered in the latter by several little *cristæ*, called *carunculæ myrtiformes*; and in the former by a kind of membranous crescent, called *hymen*: this membrane is looked upon as the seal of their virginity, although it is often but an equivocal mark of it.

148. The *hymen* is not an imaginary being,
as

as some have thought: if it does not exist in all young women, at least we meet with it in the greater part; but its figure is not invariable. It generally resembles a crescent, whose convexity is towards the bottom of the *vulva*, and sometimes towards one of its sides; in some women it represents a kind of ring, and in others totally shuts up the orifice of the *vagina*. It has been found, on account of its hardness and thickness, to obstruct the conjugal union; and even delivery, in women who had conceived notwithstanding the impossibility of that union's being so perfectly intimate; which has made it necessary to cut it. When the *hymen* entirely shuts up the entrance of the *vagina*, the woman generally remains ignorant of it till the time of *puberty*. As the menstrual blood cannot then drain off, it is accumulated in that canal, and extends it, as well as the *uterus*; which causes symptoms that do not cease till after the division of the *hymen*. These accidents have more than once caused women to be suspected of pregnancy, whom this conformation rendered unfit for generation: the examples are too frequent in authors, to make it necessary to cite any here.

149. The *carunculæ myrtiformes*, more apparent in new-married women than in those who
have

have had many children, are considered as the wrecks of the *hymen*. Their number varies; they are generally four, and sometimes only three. Similar in their structure to the *nymphæ*, like them they disappear at the moment of delivery; and, like the folds of the *vagina*, they insensibly vanish with age.

150. Before and a little lower than the *hymen*, we find another semilunar fold, called the *fourchette*. It is exceedingly rare to find it after a delivery; but its rupture, almost inevitable when the child's head passes it, has no disagreeable consequences, when it does not extend far into the *perinæum*.

151. It is between these two membranous folds, the *hymen* and the *fourchette*, that we remark the *fossa navicularis*, in which we find nothing particular.

152. The space between the *vulva* and the *anus*, is the *perinæum*. Its extent, in the natural state, is about the breadth of two fingers, but it is capable of considerable extension in labour. A kind of seam runs through its whole length, called *raphe*. This partition, this kind of bridge, between the *anus* and *vulva*, demands the particular attention of the accoucheur, to prevent its rupture in delivering the child's head; otherwise
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those two openings will form but one, which may have disagreeable consequences, and sometimes very troublesome ones. The *perinæum*, distended by the efforts of labour, has sometimes opened in the middle; and suffered the child, with the after-birth, to pass through that accidental passage, without at all injuring the integrity of the parts which form the *vulva* or the *anus*; the sphincter of the latter, and the inferior *commiffure* of the former, having been perfectly preserved*.

* A case of this latter species was communicated, a few years ago, to the Royal Academy of Surgery at Paris, by a surgeon-accoucheur of *Besançon*; and did not appear doubtful, except to those persons who are unacquainted with the distension of which the *perinæum* is susceptible, in most women, in time of labour. This fact, supported by the most authentic testimony, is not the only one which I could cite at present. A similar rupture lately happened* under the hands of one of our most distinguished accoucheurs. I saw and examined the woman the third day after delivery. The rent in the *perinæum* extended upwards, at the right side of the *vulva*, as high as the middle of the entrance of the *vagina*; and extended, in form of a T, towards each of the *nates*, before the *anus*.

● At the beginning of January 1782.

SECTION II.

Of the Uterus.

153. THE *uterus* is the organ in which the important work of generation is almost always performed. This fleshy, vascular, and membranous *viscus*, is situated in the *pelvis*, between the *rectum* and *bladder*, with both which it has connections.

154. Its figure is very like a flatted pear, of the length of two inches and an half, or thereabouts ; its breadth is from eighteen to twenty-four lines, and its thickness ten or twelve only.

155. It is distinguished into *fundus*, body, and neck. The *fundus* comprehends all that part above the insertion of the *fallopian tubes* ; the body is immediately below it, and extends to the narrowest part of this organ, where the neck commences ; this latter terminates in the *vagina*, forming a kind of large nipple, which has some resemblance to the mouth of a tench. The *uterus*, considered externally, presents two faces, both a little convex : three edges, one of which forms the *fundus*, and the other two the sides : lastly, three angles ; that is to say, two superior

perior and lateral, where the *fallopian tubes* enter; and one inferior, which projects into the *vagina*, and is called the *os tincæ*. Excepting this last part, the *uterus* is covered by the *peritonæum* through its whole extent; and this membrane adheres to it so closely, that it seems to enter its very structure; though it only envelopes it in its duplicature, as we observe with respect to the other *viscera*.

156. When the *uterus* is unimpregnated, we cannot absolutely determine what is the order and arrangement of its fibres, they are so intricably interwoven. It would be as difficult also to know their nature, if their common properties with muscles had not often manifested it in time of labour. These fibres are paler and much closer in the neck of the *uterus* than in its other parts, where they appear softer, redder, and of a looser texture: this disposition is not the least admirable circumstance in the structure of the *uterus*; since it cannot be altered accidentally, or in any way whatever, without affecting the mechanism of gestation, and even that of labour, the period of which is sometimes advanced and sometimes retarded by it. — See § 216, and following.

157. On opening the *uterus* longitudinally,
VOL. I. I we

we discover its cavity; and may estimate the thickness of its *parietes*, which in general is but three or four lines: its substance appears spongy, and as it were *diploical*, in the *fundus*, and through the whole extent of its body; but denser and closer in the neck, properly so called: which doubtless arises from the distribution of the vessels which pervade it, and which the knife divides transversely.

158. Although the cavity of the body and that of the neck^l of the *uterus* are but one, it is the custom to distinguish them from each other, and to describe them separately. That of the body is of a triangular figure, and would scarcely contain a bean: it terminates above and at the sides by two very small orifices, which form the beginning of the *fallopian tubes*; and below by another, larger, which is called the internal orifice of the *uterus*.

159. This cavity is lined by a very thin membrane, which adheres as strongly to the substance of the *uterus*, as the *peritonæum* which covers it exteriorly. It is not this membrane which exfoliates after delivery, and which is called *decidua*; that is a produce of conception: it is foreign to the *uterus*, and easily detaches itself from it; but the former is a part of its substance,
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and cannot be separated from it without inconveniences.

160. This membrane is so porous, that it appears, as it were, reticular. The most considerable of these openings lead to winding cavities, called *uterine sinuses*; and others to *folliculi* or *glands*, which furnish that mucous and glairy humour with which the internal surface of the *uterus* is continually lined; and the least of all are only the extremities of absorbing or exhaling vessels. These latter are equally distributed throughout; but the first are more numerous at the *fundus*, and the second towards the neck.

161. The cavity of the neck of the *uterus* is a kind of canal about an inch long, and a little larger in the middle than towards its extremities. It is lined by the same membrane as the cavity of the body of the *uterus*. We discover in it likewise wrinkles, which appear to be formed not only by that membrane, but by the uterine fibres also.

162. The neck of the *uterus* opens into the *vagina* by a little transverse chink, called the external orifice of the *uterus*; and it is this chink which gives the projecting portion of the neck of the *uterus* the figure of a tench's mouth. This transverse chink, several lines long, and exceed-

ingly close in the natural state, dilates a little during the flow of the *menfes*, and remains somewhat open during the first days which succeed that evacuation: on which account many women, and especially those who have not already had children, conceive more easily at that time than any other, and even cannot conceive except at that time.

163. The *os tinæ* seems about four or five lines long before, and a little more backward; its thickness is about eight or ten transversely, and from six to eight from the anterior to the posterior part, in which direction it is a little flattened. The chink is not exactly at its extremity, but a little backward; which makes its anterior lip appear thicker than the other.

164. Pregnancy and delivery commonly so efface these characters, that the *os tinæ* is entirely different in women who have had children. In them it is generally thicker and rounder; and the edge of its orifice, then almost always open, is found more or less unequal, and sometimes even, as it were, festooned; sometimes we observe only a single notch in it, and then it is almost always at the left side; at other times there are several, because there have been several rents in it at the time the child passed through it. I
must

must observe that these rents in the edge of the orifice of the *uterus*, do not always take place in labour; nor do they always proceed exclusively from that cause, in all women in whom we find them: so that the *os tinæ* may have as regular a form in women who have had children, as in those who are still in a state of virginity; or present in the latter the same inequalities which are most frequently the consequences of labour in the former. According to these observations, how rash any positive conclusions, deduced from the state of the neck of the *uterus*, will appear; especially when the question concerns the reputation or the life of a woman, as in the case of concealed birth and *infanticide*!—See § 346.

165. It sometimes happens that the *uterus* is double, or that its cavity is divided by a longitudinal partition, which extends from the middle of the *fundus* to the extremity of the *os tinæ*, so that its exterior presents nothing remarkable. In the first case, each *uterus* may have its *tubes* and *ovaria*; or else the body of that *viscus* is as it were divided into two horns, which have one neck for their base, and each horn one *tube* and one *ovarium*. The examples of such conformations, though rare, are more numerous than those of *superfetation*; and might make us

admit the possibility of it, even if we could not cite a single example to support it: but it does not appear admissible except in those cases.

166. The arteries which are distributed to the *uterus*, come from the *spermatic* and *hypogastric*. It is at the sides that they penetrate its substance, from whence their branches go backward and forward, making an infinite number of convolutions round themselves, forming a great number of *areolæ* and *anastomosing* with each other; that is to say, the spermatics with those which come from the hypogastric, and those of the right side with those of the left. Some of them terminate in the veins which accompany them; and others in a particular kind of vessels, known by the name of *sinuses*.

167. The *sinuses* form, as it were, so many reservoirs, where the blood deposited by the arteries is re-absorbed by the veins, which return it into the circulating mass; except what drains off periodically, during a certain time of life, by the orifices which are observed in the *uterus*; which periodical draining constitutes the *menstrual flux*.

168. This distribution of the uterine vessels presents us the explication of a great number of phenomena, which are observed in health, as

well as in sickness and pregnancy; and we ought not to lose sight of it when the Cæsarean operation becomes indispensable.

169. We cannot doubt of the existence of *lymphatic* vessels in the *uterus*; but their source and their course are not so well known as those of the former. They are so numerous and so large in the latter periods of pregnancy, that we might be almost tempted to believe, says Mr. *Cruikshank*, that the *uterus* is nothing but a composition of absorbent vessels. This learned English anatomist divides them into two planes, one of which accompanies the *hypogastric* vessels, and the other the *spermatic*.—See *Cruikshank*, Anatomy of the Absorbent Vessels of the Human Body.

170. The nerves of the *uterus* are derived from the *renal plexus*, and the *hypogastric*, from the great *intercostal*, and the *sacral* nerves. Considering these numerous sources, and the communication of these nerves, we ought not to be surprised at the extraordinary sympathy of this organ with all parts of the body, and at the variety of symptoms produced by the diseases which affect it.

SECTION III.

Of the Parts dependent on the Uterus.

171. THE parts dependent on the *uterus*, are its *ligaments*, the *fallopian tubes*, the *ovaria*, and the *vagina*.

172. The *ligaments*, to the number of four principal ones, are distinguished into broad, and round. We cannot have a very clear idea of the former, but by imagining a fold of the *peritonæum*, which divides the cavity of the *pelvis* transversely; the two layers of which, separated in the middle, contain the *uterus*; but, joined together at the sides of that organ, form as it were two wings, which are the broad *ligaments*. Their superior edge forms through its whole length two other parallel folds, which anatomists call pinions; one of them contains the *fallopian tube*, the other the *ovarium*.

173. The principal use of the broad *ligaments* is not to fix the *uterus* in the center of the *pelvis*, since it enjoys as great a mobility as the extent of that cavity can allow it. The *peritonæum*, in these two folds, seems, as it were, in reserve for the time of pregnancy, when we see they are
almost

almost entirely effaced by covering the *uterus*, in proportion as it developes and becomes more voluminous.

174. It is in the cellular membrane which unites the two layers of these *ligaments*, that the blood vessels run which go to the *uterus*, as well as the *trunks* of the *lymphatic* vessels which return from it, and where congestions and milky abscesses are chiefly formed.

175. We there also remark two cords, one on each side, called the round *ligaments*, which descend from the superior angles of the *uterus*, before and a little below the beginning of the *tubes*. These *ligaments* bend towards the *pubes*, and pass out through the rings in the oblique muscles: they divide into many branches; and, forming a kind of *crow-foot*, lose themselves in the cellular membrane, and in the *teguments* round about the groins.

176. These cords appear to be vascular and fleshy, as well as ligamentous. The arteries which make part of their composition, come from the spermatic; and a small nerve from the *renal plexus* accompanies them. They enlarge during pregnancy, and become plethoric, like the substance of the *uterus*: which gives them a true fleshy appearance. It is rather to their plethoric state

state that we ought to refer those pains in the groins which torment some women, whether in the latter periods of gestation, or in certain morbid affections of the *uterus*, than to their extension and stretching.

177. Besides these four principal *ligaments*, we see two others on the anterior and posterior part of the *uterus*; but they are not very apparent, except we separate that *viscus* from the *bladder* and *rectum*: they are semilunar folds of the *peritonæum*, which it has pleased some anatomists to call the little round ligaments. Those which are behind descend from the lateral, posterior, and inferior parts of the *uterus*, and lose themselves towards the *lumbar* regions: we commonly attribute the pains which are felt in those parts, in the latter periods of gestation, and in labour, as well as in the complete *prolapsus* of the *uterus*, to their extension and stretching. Those which are observed between the *uterus* and the *bladder*, are a little smaller; the uses of both seem to be the same as those of the broad *ligaments*.

178. The *fallopian tubes* are two conduits which take a winding course; they are about three or four inches in length, and their name sufficiently describes their figure. They are so narrow at the end next the *uterus*, that their ori-
fices

fices will scarcely admit a very small bodkin; but they enlarge insensibly as far as their middle, where they narrow a little, and then dilate again: they terminate in a kind of expansion, which is bordered by a fleshy fringe. This extremity is loose and floating in the cavity of the *pelvis*.

179. The structure of the *tubes* appears to be absolutely the same as that of the *uterus*; like that they are enveloped by the *peritonæum*; we find in them several orders of fibres; and they are capable of extension and contraction. One of the fleshy fringes which border the expansion of the *tube*, is attached to the *ovarium*; the others seem destined to dilate it, and apply it strictly to that body, in order to receive from it what the woman furnishes for generation.

180. When we consider the structure of these *tubes*, and their relation to the *ovaria*, their function, whatever it be, will always appear extremely wonderful; and cannot be explained but by allowing them a *vermicular* motion, which opposes the *retrogradation* of the first produce of conception. We observe, moreover, that the *tubes* establish a communication even from the cavity of the *peritonæum* to that of the *uterus*;
and

and consequently, by means of that and of the *vagina*, to the external parts.

181. The *ovaria* are two whitish bodies, nearly of the size and figure of a large bean. They are placed loosely in the posterior pinions of the broad ligaments; and are attached by a kind of ligamentous cord to the superior and lateral parts of the *uterus*, behind the origin of the *tubes*. These bodies are larger in the prime of life than in advanced age, when they in some measure wither and dry up. They are a little plump during the time the woman is fruitful; and, according to some authors, are marked with as many *cicatrices* as she has had children.

182. We know not perfectly either the structure or use of the *ovaria*: we only know that they are necessary for generation; and that to deprive animals of them, is sufficient to take away from them the faculty of propagation. The *fœtus* is sometimes developed in them; and I found in one a kind of bony rock, furnished with nine solid teeth perfectly formed: though the example is not *unique*, it is a phenomenon not less surprising; I shall speak of it more particularly hereafter. The ancients looked upon the *ovaria* as glandular bodies, and gave them the

the name of *testicles*: they thought a prolific liquor was secreted in them, like that of the man. The moderns constantly finding in them a number of little vesicles, which they look upon as so many eggs, think they are nothing but the reservoirs of them.

183. The ideas that have been entertained of the *ovaria*, have given rise to various opinions concerning the impenetrable mystery of generation: that of the ancients produced the system of the mixture of the two feeds; and that of the moderns, the system of eggs.

184. The *tubes*, the *ovaria*, and the *ligaments* of the *uterus*, are supplied by the *spermatic* vessels, which form by their division, in women as in men, a kind of body like a vine, from whence the different branches go to their destination.

185. The *vagina* is a membranous canal, naturally narrow in virgins, and always so short, that we may easily touch the neck of the *uterus* with the extremity of the finger; but its dimensions vary according to circumstances. It may be stretched to the length of more than half a foot, and widened so as to contain the head of a child: but it soon returns to its natural state, when the causes of its alteration cease to act; which proves that its texture is very elastic.

186. The

186. The anterior part of the *vagina* is much shorter than the posterior, because that canal is a little curved towards the *pubes*, and its two extremities are, as it were, cut with a slope. One of them embraces the neck of the *uterus*, about five or six lines above the external orifice; from whence the internal membrane of that canal seems to be reflected over the *os tincæ*, and continued into the *uterus* itself. The other extremity of the *vagina* forms the entrance of it: it is surrounded by a very considerable vascular *plexus*; and embraced by two fleshy bands, which mount from the *sphincter ani* to the *clitoris*, called *constrictor* muscles. The plethora and swelling of the former, joined to the contraction of these latter, narrow the entrance of the *vagina* more or less, and often in a very remarkable manner.

187. In the middle of that vascular network are found two glands, of the size of a small French bean; whose excretory duct, which is several lines long, opens into the sides of the orifice of the *vagina*; and there emits, sometimes with force, the liquor secreted by those glands.

188. The structure of the *vagina* is not yet very well known. Some give it a fleshy coat, composed of two orders of fibres; that is to say,
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longitudinal and circular. Others, with more reason, allow it only two membranes; of which the internal, much more extensive and of a closer texture than the other, forms an infinite number of folds or wrinkles, which singularly diminish the capacity of that canal; while the external is merely cellular. It is those folds in the former, and which nature has placed there as in reserve for the time of labour, which permit the *vagina* to lengthen and enlarge as occasion requires.

189. Between the two membranes of the *vagina*, and chiefly towards its inferior extremity, run considerable blood-vessels; and there we find a great number of glands, which secrete the mucous liquor which always lines the inside of that canal. We observe in it, moreover, a sort of *diploical* or cavernous texture, into which the blood seemsto rush during the venereal *orgasm*, as it does into the *corpora cavernosa* of the *clitoris*.

190. The axis of the *vagina* is not the same as that of the *uterus*: these two parts form an elbow more or less considerable, which ought to be well observed in certain cases. The salient part of this elbow is towards the *sacrum*, and the returning part towards the *pubes*: this disposition,

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it is true, is not the same in the latter period of labour, and does not merit the same attention.

191. The *vagina* is not insulated in the midst of the *pelvis*: it has very close connections, by means of the cellular membrane, with the canal of the *urethra*, with the lower part of the *fundus* of the *bladder*, and with the *rectum*.

192. Its vessels arise from the *pudica communia*, which likewise send some to the external parts of generation; and its nerves come from most of the sources which supply the *uterus*.—See § 170.

193. Transverse partitions have often been found in the *vagina*; and it has been known to open into the *rectum*, in women who wanted the external parts of generation, without this vicious conformation having rendered them absolutely barren.—See Barbaut, tom. i. p. 59.

C H A P. II.

Of the Gravid Uterus.

194. **I**F, in the first period of life, nature seems to forget the *uterus*, to labour at the perfection of other parts; almost entirely occupied upon that *viscus* during pregnancy, and upon the wonderful operations carrying on within it, she produces in it the most surprising changes. It in a manner enjoys a new life, it takes a new form, a new situation, a new organization, and its muscular powers are eminently developed, against the time of labour. The changes which the *uterus* undergoes during pregnancy are then in its volume, in its figure, in its structure, in its situation, and the action of which it becomes susceptible.

 A R T I C L E I.

Of the Changes which Pregnancy produces in the Volume, Figure, and Structure of the Uterus.

195. **T**HOUGH we do not perceive very clearly what passes in the *uterus* at the instant

of conception, nor even in the first periods of pregnancy, there is however a great probability that its orifices, at first a little open to receive the *semen*, presently close to retain it. But does its substance contract to embrace the *germ* more closely, and does its cavity become less, immediately after impregnation, as some have thought? There is no experiment which can throw the smallest light on this subject. If the *uterus* has been found in that state of contraction in animals that have been opened immediately after *coition*, was not that contraction the effect of the violent death they had been made to suffer, rather than of the impregnation? and does it follow that the same thing takes place in a woman who conceives with pleasure, and who feels no pain from it afterwards?

196. The augmentation of the *uterus* is scarcely sensible from one month to another at the beginning of pregnancy; but it becomes so large in the sequel, that it is difficult to conceive how it can be effected. Till the third month, the *uterus* in most women continues small enough to be contained within the cavity of the *pelvis*; and it is not generally till the fourth that its *fundus* rises sufficiently above the superior *strait*, to be manifestly felt by applying the hand to
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the *hypogastric* region. In the fifth month it mounts to within two fingers breadth of the *umbilicus*, and is as much above it at the end of the sixth. In the seventh, it enters the *epigastric* region, and occupies a great part of it in the eighth ; but is often found below it at the end of the ninth.

197. Although the *uterus* increases in every direction during pregnancy, in proportion to the augmentation of the produce of conception; yet all its diameters do not increase in the same proportion in every period, whether in respect to themselves, or to the *fœtus*. The longitudinal axis of this *viscus* increases much more from the third to the sixth month, than from that to the ninth : while the other dimensions augment much less in the first periods than in the latter ; when the cavity evidently grows rounder in all parts, without however entirely losing that oval figure which appears natural to it. This cavity, relatively to the *fœtus*, is very large in the two first months, and very small in the latter.

198. These differences, minute perhaps in appearance, but important with respect to the views of nature, depend on the structure of the *uterus*, on the degree of resistance presented by

its different parts, and on the almost invariable order in which its development takes place.

199. The fibres of the *fundus* and body of this organ, more supple, and naturally much more disposed to unfold, than those of its neck, furnish almost the whole of the amplification necessary before the sixth month of pregnancy; so that till that time the *uterus* seems to borrow nothing from its neck. It is at that epoch that the fibres of the latter part begin to develop, and contribute with the former to the dilatation necessary for the convenient lodgment of the *fœtus* and its appurtenances. From this time all the fibres extend and unfold in the same proportion, and continue to do so for some time: but, towards the end of pregnancy, the dilatation of the *uterus* is made almost entirely at the expence of the fibres of its neck, because those of the *fundus* make a greater resistance; and there no longer exists a perfect equilibrium in the reaction of those two parts, either on each other, or on the produce of conception.

200. As soon as that equilibrium is destroyed, the fibres of the body, and especially those of the *fundus* of the *uterus*, begin to make efforts to expel the substances which constitute the pregnancy,

nancy, and do it in a manner sensible to the touch. If we then introduce the finger through the orifice of the *uterus*, so as to touch the membranes of the *fœtus*, we find them flaccid one moment, and tense the next; which clearly demonstrates this alternate action.

201. At this time the fibres of the neck of the *uterus* sustain not only the whole effort of the internal agents, which they participated before with those of the *fundus*, but also the effect of the re-action of the latter on those same agents; which constrains them to unfold so rapidly, that in less than two months the neck is developed, and entirely effaced.

202. If the cavity of the *uterus* becomes still larger after this time, it is all at the expence of these fibres, now become weaker. At first they distend and lengthen: then they seem to range themselves by the side of each other; which renders the *uterus* so thin in this part, that the edges of its orifice are often no thicker than two or three folds of common paper.

203. It is by the same mechanism that the dilatation of the orifice of the *uterus* begins to be effected, and the labour pains manifested. If the end of the ninth month of gestation is almost always the epoch of those pains, it is be-

cause the order of the successive development of the different parts of the *uterus*, as I have stated it, is almost immutable: for it cannot vary without retarding or accelerating the time of labour, which seems to be the natural effect of it.

204. Whenever the fibres of the *fundus*, and body of the *uterus*, too strongly resist development in the first periods of gestation, delivery takes place before the proper time, and quite as naturally as at the end of the ninth month; because those of the neck are forced to unfold prematurely, and cannot support the re-action of the others beyond a certain time. On the contrary, labour happens later in those women where the neck of the *uterus* does not unfold at the time intended by nature; whether because the fibres of the superior parts are more extensible and less irritable than usual, or because the neck is affected by a scirrhus hardness.

205. This double assertion is not, as some may imagine, merely the fruit of speculation, intended to square with an established theory; but a truth which experience and observation have many times demonstrated. I have met with a great many of these cases where premature delivery has been entirely owing to the feeble organization,

nization, either natural or accidental, of the neck of the *uterus*. I have frequently predicted, without the least fear of being deceived, that it would happen so—sometimes at five months, sometimes at six or seven, according as the development was more or less advanced—when I examined the woman at a time when the neck of the *uterus* ought still to have had all its natural firmness, thickness, and length: the event has constantly justified my prediction. If the premature development of the neck of the *uterus* accelerates thus the course of gestation, and advances the epoch of labour; it seems to be equally proved, that a defect of expansion in that part, at the usual time, may prolong one and retard the other, as we have a thousand times observed that its natural or accidental compactness has singularly prolonged the duration of labour, when it has begun at the period prescribed by nature in almost all women. As the observations which I have collected concerning this cause of retarded birth, are not supported by all the authenticity I could have wished to give them, and which seems necessary to carry conviction, I shall pass them over in silence for the present.

206. When we compare the *uterus* at the ap-

proach of labour with what it was before pregnancy, we see that its extension is less the effect of a simple development, than of a kind of generation, or rather of increase, which does not always take place without injuring the original parts. According to M. *Levret*, the solid mass of the *uterus* in its natural state, or in a state of vacuity, is about four cubic inches and an half, and at the latter end of gestation fifty-one inches ; so that, says he, the proportion of the smallest *uterus* to the largest is nearly as 9 to 102, or as 1 to $11\frac{1}{2}$ *.

207. The *uterus* does not, in fact, extend after the manner of the bladder : if its *parietes* do not preserve all their natural thickness while it acquires a larger capacity, at least they lose so little of it, that many authors have thought it remains the same in all periods. Indeed, while those have advanced that the *uterus* in developing loses nothing of its thickness, others have maintained that that thickness diminishes insensibly from the first period of gestation to that of labour ; and some, of an absolutely contrary opinion, assure us that, far from diminishing, it augments in the same proportions as the uterine cavity becomes larger.

* L'Art des Accouchemens, troisieme edit. p. 309.

208. Such a variety of sentiments on a matter of fact, may have arisen from the part of the *uterus* that has been examined, and from the time at which they have endeavoured to estimate its thickness. It is moreover certain that the *parietes* of the *uterus* do not present the same thickness in all women at the latter end of gestation, nor in the same woman at the end of every pregnancy; for, independently of the differences which may be looked on as individual, there are accidental ones, which depend on the smaller or greater degree of dilatation in each pregnancy, and on the quantity of fluid determined to the *uterus*, to nourish and develop its substance.

209. To judge of the thickness of the *parietes* of the *uterus*, at the latter end of pregnancy, we ought to examine that *viscus* in the state of its greatest dilatation, that is to say, before the waters of the *amnion* are evacuated; for that thickness augments in proportion as it contracts, and its cavity diminishes, immediately after delivery—we ought to examine it in all parts, because there are some where it is constantly thicker, and others where it is always thinner, than in its natural state. The place where the *placenta* is

is attached, is always that where the thickness of the *parietes* of the *uterus* is the most considerable ; and the vicinity of the orifice that where it is least. If it does not augment in the former during pregnancy, at least we may be sure it remains such as it was in every part before impregnation ; it is the only part where it seems to preserve the same state. It diminishes in the rest, and very manifestly in the neck, so that the edge of the orifice is often no thicker than two or three folds of writing paper.

210. Admitting that the thickness of the *parietes* of the *uterus* diminishes in proportion as its development takes place, yet we are not to suppose it to that degree which *Mauriceau* has published, rather according to the opinion of some of his predecessors, than from his own experience. Except in the vicinity of the orifice, where it is generally very thin at the approach of labour, it has been found in all parts to be of about half the thickness it was of before pregnancy.

211. The greater thickness which has been observed in the part where the *placenta* is, as it were, grafted, has made many accoucheurs, and particularly M. *Levret*, believe that this portion
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of the *uterus* was less developed than the rest, and preserved a greater density*; but by following them step by step we are tempted to embrace the contrary opinion, and to believe with *Deventer* that this part extends itself more than the others. *M. Levret* himself seems to prove it, when he assures us that “the *fundus* of the *uterus* retains a considerable thickness, notwithstanding its prodigious extension at the end of gestation, when the *placenta* is attached there †.”

212. If it is demonstrated that the *parietes* of the *uterus* preserve the thickness which they have at the end of pregnancy only by the influx of fluids; that their vessels dilate; in one word, that they become more spongy and humid—why not admit that the place where the *placenta* is attached develops itself as much as the others, if not more?

213. A healthy *uterus* extends itself uniformly in every point, but according to the number of fibres and vessels in each of them. If it has been sometimes found of an irregular form towards the end of pregnancy, that irregularity,

* Observations sur la Cause des Accouchemens Laborieux, part i. p. 120, 130, &c.

† L'Art des Accouchemens, § 279.

which

which is often only momentary, depends on the form the child takes in its motions, or on the position it rests in ; for the *parietes* of the *uterus* are never drawn so tight on the produce of conception, as not to be able to yield to that change of figure, except at the instant of strong contractions, or of labour pains.

214. I have observed that the *parietes* of the *uterus* thicken in proportion as its cavity diminishes, and as its fibres contract in length : the time when they present the greatest thickness, seems then to be immediately after delivery. That thickness, incomparably greater than before labour, still increases in the first moments, because there is a greater influx of blood into the substance of the *uterus* than can be discharged from it.

215. According to the part we examine, and the time in which the examination is made, we shall find the *parietes* of the *uterus* thicker or thinner. Those who only attend to the thickness which the edge of the orifice often presents at the approach of labour, and especially of a first labour, will believe with *Mariceau*, who was the echo of *Galen*, *Avicenna*, *Aetius*, &c. that the *uterus* becomes considerably thinner in the course of its development ; while those who
only

only judge of it from its appearance after delivery, will, on the contrary, imagine that it thickens.

216. Those who are acquainted with the texture of the *uterus*, and the extraordinary resistance which in its natural state it opposes to any dilating force, cannot, without astonishment, see it yield in pregnancy, and permit the *fœtus* to be freely evolved in it: the more we consider it, the more wonderful the operations of nature will appear in this part of her work.

217. The natural cavity of the *uterus* being sufficiently large to contain the produce of conception during the first days, nature seems to employ that time only in relaxing the fibres which must first give way: by thus attacking at first only the weaker, she procures more time to subdue the others, and dispose them to accomplish the same views. Always economical in her means, she employs nothing but fluids to produce all these wonderful effects. While the small quantity of water which surrounds the *embryo*, and which continually distils into the *uterus*, acts against every point of the internal surface of the *viscus* with a force relative to the base and height of the current which determines it

it to that part *, the fluids which circulate slowly in the vessels of its substance exert the same efforts to dilate and develop it, as many authors have observed †.

218. The fibres of the *uterus* not only unfold and lengthen during pregnancy, but they also become softer, more spongy, and redder; so that at last we recognize in them all the appearances of muscular fibres: like them too they are extremely irritable, and capable of contraction.

219. If pregnancy brings about these changes in the fibres of the *uterus*, delivery produces exactly the contrary. They gather up and shorten during the expulsion of the child and its dependencies; then they become denser and paler, in proportion as their depletion takes place: so that, about five or six weeks after delivery, the *uterus* appears nearly in its original state.

220. The vessels of the *uterus* are not exempted from the effects of pregnancy. Bound to the fibres which they supply, and extended by them in their development, their numerous

* Puzos, *Traité des Accouchemens*, p. 26, et suiv. Levret, *L'Art des Accouchemens*, troisième edit. aph. 351. David, *Traité de la Nutrition et de l'Accroissement*, p. 4, et suiv.

† Levret, *ibid.* aph. 256. 348. 352. Roëderer, *Elements de l'Art des Accouchemens*, § 67.

windings are effaced ; and being less pressed by the fibres which surround them, some of them are dilated to a surprising degree.

221. If that dilatation is not observed in all the regions of the *uterus* where there are sensible vessels, at least we observe it constantly in the part occupied by the *placenta* : there all accoucheurs know that many of the *sinuses* mentioned in par. 167 become large enough to receive the end of the little finger ; and the others, a moderate-sized quill. It is not only the sanguine vessels which are developed to that degree during pregnancy : the lymphatic vessels are much more so, in proportion to their primitive diameters ; since, according to Mr. *Cruikshank*, they become as large as a goose quill ; and besides appear so numerous, that the *uterus* seems to be nothing but a mass of those vessels.

222. The changes which pregnancy produces in the direction and diameters of the uterine vessels, do they not declare those which the circulation must likewise undergo in them ? In proportion as the *uterus* is developed, as its texture becomes softer and more spongy, the arteries being straighter and less pressed, give less resistance to the course of the blood ; the motion of that fluid becomes freer in them ; they then receive

receive a greater quantity in a given time ; they transmit more into the veins, as well as into the *sinuses* or reservoirs which communicate with the *placenta*, and deposit there the portion of blood destined to vivify the *fœtus* and all its dependencies.

223. If these first phenomena are so many natural effects of the development of the *uterus* during pregnancy, its contraction at the moment of delivery produces others not less interesting, since they furnish us with useful reflections in practice.

224. In proportion as the cavity of this *viscus* diminishes, the vessels fold and become convoluted as they were before impregnation: they suffer a compression not only so much the stronger, as the action of the *uterus* on the contained body is more powerful, and as that body gives a greater resistance ; but also as it approaches nearer to its natural state.

225. During this time the blood flows more difficultly through the arteries, and passes more slowly into the *sinuses* ; the *sinuses* receive a smaller quantity of it in a given time than before, and transmit less into the parts indicated in par. 222.

226. The blood passes with so much difficulty in the arteries of the *uterus* when the labour

bour becomes strong and lasting after the evacuation of the waters of the *amnion*, that all communication seems to be intercepted between that kind of vessels and the *sinuses* in which they partly terminate ; and between the *sinuses* themselves and those of the *placenta* : so that the child can be no longer vivified by the blood of the mother, nor is there any considerable flooding to be feared if the *placenta* should be detached ; and, if any existed before, it will from that time be suspended. The closing and contraction of the *uterus* after the exit of the child, and still more after delivering the after-birth, produce the same phenomena.

227. It is on these observations that is founded the precept which will immortalize the celebrated *Puzos*, and the rational practice which he wisely substituted to the blind and murderous *routine* followed by most accoucheurs before his time, in cases of violent flooding *. They serve equally for the base of an enlightened theory on the origin and natural cessation of the sanguine and ferous *lochia*, and for the explication of several other effects which I shall speak of in the sequel.

* Voyez l'Ouvrage de Puzos, Memoire sur les Pertes de Sang.

A R T I C L E II.

Of the Action of the Uterus.

228. THE *uterus*, very sensible and very irritable, in common with all muscles, enjoys two modes of action—a tonic action, or elasticity, which is equal and constant; and a spasmodic contraction, which is sudden and momentary. By the former, when it is distended it constantly endeavours to restore itself to its original state; but it is by the latter that it acquires the force necessary to overcome the obstacles to that restoration, and to deliver itself of the bodies which encumber and incommode it.

229. The tonic action of the *uterus*, or its elasticity, subsists after death, and seems to continue as long as the heat of the subject. The expulsion of the *fœtus* and its dependences, after the death of the woman, seems to confirm this truth*; and it is likewise proved by the contraction of the *uterus*, which takes place as

* Many authors assure us, that some women have been spontaneously delivered after their death; I shall dispense with quoting them. M. *Leuret* adds to their testimony, by saying that he is convinced of it from his own experience; but I do not make myself responsible for any of these facts.

quickly and strongly as after the most common labour, when we extract its contents at the instant life ceases *. If we have a right to conclude, from these observations, that the tonic action of the *uterus* continues some time after the cessation of life, experience equally proves that it may be so weak after delivery as to appear in some measure destroyed. As the *parietes* of the *uterus* then remain soft, and without apparent action, it is usual to express that state by the name of *atony*. I must observe, with the surgeon of *Dijon* whom I have just quoted, that the atony in question is not an absolute loss of tone in the *uterus*; but only a diminution of its action, and of its irritability and sensibility; a state of weariness, of *exhaustment*; or, in one

* M. *Le Roux*, surgeon, of *Dijon*, perceived, in delivering a woman who had been dead about a quarter of an hour, that the *uterus* contracted in proportion as he disengaged the child from it; and was as firm and solid as if the woman had been living. When he proceeded to extract the *after-birth*, the neck of that *viscus*, he says, obstructed the introduction of the hand so much, as to give him some doubts of the reality of the woman's death. (*Voyez Traité des Pertes, observ. xiii. p. 25.*)—In opening the body of a woman, whom I had delivered in the same manner immediately after her death, I found the *uterus* strictly contracted on the *placenta*, which I had not thought necessary to extract after the child.

word, of *syncope*, to make use of the expression of the aforesaid surgeon.

230. In this state the irritability and sensibility of the *uterus* are sometimes so weakened, that it will without difficulty bear the presence of the hand; and even stimulating liquors injected into it cannot force it to contract. This case, often melancholy for the woman, is at the same time one of the most deplorable for the operator, whom unreasonable people consider as accountable for all events; for, notwithstanding his utmost care and activity, he has almost always the mortification to see the woman sink under the hæmorrhage.

231. The atony of the *uterus*, considered in this sense, may affect all parts of that *viscus*, or only one. Sometimes it takes place in the *fundus* and body only, while the neck enjoys its full tone; at other times the neck alone is attacked by it, while the other parts contract and close as usual. It may be in a greater or less degree; and manifest itself at the instant of delivery, or some hours, and even days, afterwards; it may go off and re-appear a number of times, like a *syncope*, properly so called: so that it is not sufficient that the *uterus* be contracted in the first moments, as almost always happens after
2 delivery,

delivery, for the woman to be secure against an hæmorrhage, and for the accoucheur to dismiss all fear*.

* There are many examples of flooding, some hours, and even days, after delivery, though at first there was no more than the usual discharge. I have seen this accident not appear till the eighth day after delivery, and in another case not till the thirteenth. The *uterus* was soft to the touch, its neck was flaccid, and the hand might easily have been introduced. Extravasations of blood may be formed in the *uterus* at periods as distant from delivery, if the neck should be strongly contracted or stopped up by any foreign body. A woman became a victim to an internal hæmorrhage of this species the seventh day of lying-in; because a surgeon, to stop the flowing of the blood, had imprudently filled up the *vagina*: the truth of this fact may be relied on. The following will perhaps be thought to present something more extraordinary, which I shall not undertake to explain;

A woman six months gone, having been delivered the 29th August 1776, passed the first five days quietly; the revolution of the milk being completed, and the *lochia* already whitish. At that period, a troublesome sensation of numbness in the whole right side, comprehending the leg and arm, informed her that the *menfes* were going to appear, that numbness having been the forerunner of them for eight years. In fact the blood appeared; and the woman lost more than a dozen porringers before she received any assistance. The next day, at the same hour, every thing going on as naturally as before the hæmorrhage, the numbness returned, and was followed by an evacuation still more copious than before, which threw her into the most imminent danger: she recovered, however, but her convalescence was very tedious.

232. The remote cause of atony may be, a bad constitution in the woman ; an hæmorrhage from the *uterus* itself, which sometimes precedes or accompanies labour ; an extreme dilatation, when the *uterus* contains much water, or several children. It may be the effect of strong and long-continued labour pains, because the forces of the *uterus* may be exhausted, as well as those of other organs ; and a sinking always succeeds every species of immoderate action. Lastly, it is never more to be feared than after those deliveries which the vulgar regard as the most fortunate, because they are the quickest and least painful. In this sort of cases, the *uterus* being evacuated suddenly, and without any efforts, the child is, as it were, washed out by the current of the waters ; and the *uterus* falls into a kind of stupor and relaxation, which for a time suspend its contractile faculties.

233. This state of uterine *syncope* is more or less troublesome and dangerous, as it continues a longer or shorter time ; as it affects all parts of the *uterus*, or only one ; and as the *placenta* preserves more or less of its connections with that *viscus*. The atony whose remote cause is an hæmorrhage which has preceded labour, is more dangerous than that which arises from the

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the quick and too sudden evacuation of the contents of the *uterus*. In this latter case there is nothing alarming while the *placenta* is not detached in any part ; but it may have consequences equally dangerous, if that body should separate before the forces of the *uterus* be sufficiently restored. An atony of the neck only is not so alarming as that which affects the *fundus* and body of the *uterus* ; because the *placenta* is most commonly attached to the latter, and more open orifices are found there than in the former, &c.

234. An hæmorrhage is the only accident which can essentially arise from an atony of the *uterus* ; but it cannot take place unless the *placenta* be detached, either totally or in part. The quantity of blood which a woman loses in a given time, is in proportion to the degree of atony, to the quantity of the *placenta* separated from the *uterus*, and to the *momentum* of the blood, often augmented by the labour pains which have preceded it *. The hæmorrhage is not

* A woman lost before my eyes, and in presence of at least thirty-five of my pupils, more than four pounds of blood in the short space of three or four minutes, notwithstanding the promptitude with which she was assisted : the *coagulum* collected from the bed, and put into the scale, weighed more

not always apparent: the blood sometimes is retained in the *uterus*; and may so far dilate it, as to give it nearly the capacity it had before the exit of the child*.

235. A concealed hæmorrhage is more usual when only the body and *fundus* of the *uterus* are affected by an atony, than when it takes place in all parts of it. The closing of the neck, in the former case, is sufficient to retain the blood in the cavity; whereas, in the latter, a congestion cannot be formed, unless some foreign body mechanically stops up the *vagina*.

236. The state of weakness and relaxation which we call atony, disposes the *uterus* to be inverted, if we attempt to extract the *placenta*, when it still adheres, before the *uterus* be contracted, and reduced to a kind of globe, a little firm to the touch; as also if the woman exerts strong efforts to expel it, while that *viscus* is soft and inactive,

than three pounds. The woman was able to be carried home; and was so, contrary to my wish, some hours afterwards, without the least inconvenience.

* In the woman whom I mentioned in one of the former observations, though at the seventh day of her lying-in, the extravasation of blood in the *uterus* was so considerable, that its *fundus* rose above the *umbilicus*.

237. The indication presented by an atony of the *uterus* consists in rousing the faculties which are, as it were, asleep—in augmenting the sensibility and irritability of that *viscus*: this is done by frictions on the hypogastric region; by applying hot cloths to it, and sometimes cold liquors, either *aqueous* or *spirituous*; and by injecting them into the cavity of the *uterus*. A flooding which arises from this state of atony requires no other treatment; and cannot be stopped but by the restoration of the faculties in question.

238. The spasmodic contraction of the *uterus* is a much more powerful action than its elasticity: it is produced by an irritating cause unknown to us; and, unlike that of most of the muscles, is not subjected to the will: no woman can augment its force, or diminish it; accelerate its return, or retard it; though strong passions of the mind may call it into action, or stop its progress.

239. All parts of the *uterus* contract at the same time, no one remaining at rest while the others act: but this contraction is not equally strong in every part; for, if it were, delivery could not advance. If it is stronger in what is commonly called the *fundus* than in its neck, it
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is because the fibres are not equally disposed, nor equally numerous in those two parts: each *fasciculus*, taken separately, seems to act with the same degree of force *.

240. The *uterus*, briskly irritated against the obstacles which oppose it, especially in difficult labours, contracts with so much force, that it often exhausts its strength, and falls into a state of inactivity; or is ruptured, and forces the

* Although it is easy to acquire the demonstration of this truth—though it is so evident that it cannot escape a man of the least degree of skill, even him who has no other guide but nature—yet opinions are still divided concerning the contraction of the *uterus*. While some refuse that *viscus* the faculty of contracting after the manner of the muscles, and only allow it a tonic action; others maintain that the neck falls into a relaxation, while the *fundus* and body act powerfully. Some assure us, with the same confidence, that the region to which the *placenta* is affixed, contributes nothing to the expulsion of the *fœtus*; and some, in spite of the testimony of the senses and of reason, see in all parts two planes of fibres, whose action is alternate; the internal plane being in a state of relaxation and rest, while the external strongly contracts. The hardness which the *parietes* of the *uterus* present, during the pain, in every part accessible to the finger, whether we touch them immediately, or through the coverings of the *abdomen*, clearly demonstrates that all its parts contract at the same time, and that no one is at rest while others act; since that momentary hardness is the distinguishing mark of contraction in muscles, as suppleness is of a state of rest or inaction.

child

child into the abdominal cavity. This action is so powerful in some of these cases, that the hand of the most robust accoucheur cannot support it above an instant without fatigue, and without suffering pain and numbness.

A R T I C L E III.

Of the Changes of Situation which the Uterus may undergo during Pregnancy, and of its Obliquity.

241. AT whatever time we consider the situation of the *uterus*, and its connections with the neighbouring parts, especially during gestation, we rarely find its longitudinal axis parallel with the axis of the *pelvis*, and more rarely still with a line which would divide the body of the woman vertically into two equal parts. Placed between the *bladder* and the *rectum*, whose form and volume change many times a day; floating in some measure in the midst of the *pelvis*, in its usual state, notwithstanding the numerous *ligaments* which seem destined to fix it; subjected to the impulse of the abdominal *viscera*, and,

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like them, to the action of the abdominal muscles and the *diaphragm*, as well as to that of some external agents—the *uterus* has no absolutely determined situation ; and takes, as I may say, a new one every instant. Sometimes it is lower or higher ; sometimes it is inclined towards the *sacrum* or towards the *pubes*, and at other times to one of the sides,

242. These momentary *deplacements*, which depend on the situation and the natural form of the *uterus* ; on the disposition of its *ligaments*, and its connections with the neighbouring parts, would merit no attention, if their mechanism did not throw some light on that of some other *deplacements* of a more serious nature ; not only because they are greater, but because they may disturb the harmony even of the most important functions. It is, in fact, to the same causes that we are to attribute the descent or *prolapsus* of the *uterus*, and those *deplacements* known lately by the denomination of *retroversion* and *anteversion*, as well as its obliquity.

SECTION I.

Of the Descent or Prolapsus of the Uterus, of its Retroversion, and Anteversion.

243. IF the *uterus*, in a state of vacuity, descends by the smallest impulse from the abdominal *viscera*, it does it in a much more remarkable manner during the first months of gestation; as well because it presents a greater surface to those same *viscera*, which renders their impulsion stronger, as because its weight becomes specifically greater. It not only descends farther at every impulse it receives, to rise again afterwards; but in general we find it habitually lower in these first periods of gestation than it was before: and we observe that its *fundus* is almost always inclined backward, and its orifice turned forward.

244. This first degree of precipitation cannot be regarded, in the generality of women, as a preternatural state; since it produces no derangement in the functions, and at most only causes a little painful pulling towards the groins and *umbilicus*: but it cannot be increased without causing greater inconveniences. Abstracting all causes

causes foreign to pregnancy, the *uterus* descends so much the more in the first months of gestation, as the *pelvis* is more spacious, and as the woman has already had more children. In some it rests on the internal face of the *perinæum*; and in others its neck, and even the whole of its body, clears the *vulva*, and appears without. I have seen such descents of the *uterus* in the fourth month of gestation, in several women; and after the sixth month in another, who thought she might safely quit a very large *pessary* which she had worn a long time.

245. The accidents which arise from this first species of *deplacement*, are in proportion to its extent, and the volume of the *uterus* relatively to the capacity of the *pelvis*. A sensation of heaviness at the fundament; painful draggings about the groins, the *umbilicus*, and the loins, are the only ones which accompany the first degree of precipitation of the *uterus*: a sensation of weakness, lowness, and faintness supervenes, if the *uterus* descends farther; and the woman insensibly falls into a *marasmus*, if some remedy be not applied. I have seen several, in whom the return of health and flesh has been produced merely by the application of a *pessary*.

246. If the effects of a precipitation of the
uterus

uterus are limited to a few slight inconveniences in the first months of gestation, it is not always so in the sequel. The *uterus* increasing more and more, and remaining so low, may compress the neck of the *bladder*, the *urethra*, and the *rectum*, in the same manner as a wedge strongly pressed into the middle of the *pelvis*; which must occasion a retention of urine, a constipation, and other accidents which will arise from those, as well as from the pressure which the *uterus* itself must exert on the other circumambient parts.

247. It is not only in those cases where the *uterus* is thus developed in the midst of the *pelvis*, that it occasions a retention of urine; the same accident may happen if the *uterus*, less voluminous, descends so far as to engage itself very forward in the external parts, and shew itself without. This case, more easy to distinguish than the former, and in appearance more severe, since the descent of the *uterus* is greater, is not however so troublesome with respect to the retention of urine. When that symptom proceeds from such a degree of precipitation of the *uterus*, it manifests itself all at once; and it is often the first effort of the woman to make water that forces it so low. In the other case,
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the retention of urine comes on slowly, and it is very rare that it takes place before the fourth month of pregnancy. At first the woman only finds a little difficulty in making water; and greater obstacles succeed, by insensible degrees, till the retention becomes complete.

248. The course of the urine is quickly restored, in the former case, by pushing up the *uterus* in the *pelvis*, and supporting it so with the finger. Even that assistance in many circumstances would not be necessary, if the woman would lie on her back, and keep the breech raised, whenever she feels an inclination to make water.

249. We cannot so easily prevent or remedy it in the latter case. For it to cease, the body of the *uterus* must rise towards the middle of the belly, and be so far developed that it cannot descend again into the *pelvis*; which generally does not take place till after the fifth month of pregnancy, and sometimes later. In the mean time, we may favour the discharge of urine by removing the body of the *uterus* from the *urethra* and neck of the bladder, with a finger introduced pretty high behind, and a little on one side of, the *symphysis* of the *pubis*; or we may draw it off with the *catheter* as often as occasion requires.

250. The

250. The mobility which the *uterus* preserves in the midst of the *pelvis*, in the first periods of impregnation, notwithstanding the augmentation of its volume, and the inclination which it takes in sinking a little, expose it to another species of *deplacement*, less known* and more rare than the *prolapsus*; but whose consequences have hitherto appeared more disagreeable. In this new species of *deplacement*, the *uterus* seems to be laid lengthwise, between the *pubes* and *sacrum*; but so that its *fundus* some-

* A great number of authors nevertheless have furnished examples of this species of *deplacement*: but these isolated examples did not fix the attention of any practitioner in a particular manner; and no person before M. *Des Granges*, a surgeon graduated in the college of Lyon, collected them, in order to form them into a body of doctrine. His *memoir* on the *retroversion* and *anteversion* of the *uterus*, crowned in 1785 by the Royal Academy of Surgery, leaves nothing to be wished for on this subject, and will doubtless be printed among the memoirs of that academy. We shall there see that it was the Observations of Doctor *Hunter* which principally contributed to excite our attention to this kind of *deplacements*; that M. *Wall*, who procured that physician the opportunity of observing it for the first time, had acquired the knowledge of it from the lectures of *Gregoire*, a surgeon of Paris; and that it was M. *Choppart*, at his return from a journey to London, who acquainted the Academy with the Observations of the English physician.

times remains a little higher than its orifice, and sometimes much lower, or appears on the same line: which constitutes so many degrees necessary to be observed in practice.

251. The accoucheurs who have mentioned this *deplacement* of the *uterus*, before Dr. *William Hunter*, have described it by the name of *inversion*; and M. *Levret*, to distinguish it from that which sometimes takes place after delivery, and in which the *uterus* is turned inside out, called it the *transverse inversion**. The names *retroversion* and *anteversion*, without giving a more exact idea of this species of *deplacement*, have been used, since the English accoucheur I have just mentioned, by all those who have communicated their observations on this point; and it is by these denominations that I shall treat of it.

252. The *retroversion* is that *deplacement*, in which the *fundus* of the *uterus* is turned towards the *sacrum*, and the orifice towards the *pubes*; and the *anteversion*, that in which the *fundus* is carried behind the *pubes*, and the orifice before the *sacrum*. Both one and the other may be more or less complete; but yet it seems, from the structure and connections of the parts, as well as

* See Journal de Médecine, tom. xl. p. 279.

from observation, that the *anteversion* cannot become so considerable as the *retroversion*: it is besides more rare and less troublesome.

253. The *uterus* may be inverted in either of these ways, while unimpregnated, and in the first three or four months of pregnancy. After the fourth month, its volume is generally so great that it cannot suffer such a *deplacement*; because its height at that time, in most women, exceeds the breadth of the *pelvis*, taken from *pubis* to *sacrum*. One of the observations of *Smellie* seems nevertheless to prove, that this inversion in some cases may take place later, if he really found it in the woman who is the subject of it; since she was advanced in her pregnancy five months*.

254. This inversion may take place slowly or suddenly; and the determining causes are then different. In the former case, we may observe its progress from day to day, or from week to week, and it arrives insensibly at its highest degree†; in

* *Smellie*, trad. Franç.

† I demonstrated this slow course of the inversion of the *uterus* to the pupils who attended my lectures towards the end of the year 1775. The inversion was not complete till after three or four weeks, nor was it till that epoch that the woman found herself obliged to submit to the necessity of reducing it.

the latter it becomes complete in less than an hour, and often in an instant*.

255. When it takes place slowly, it seems to depend on the slight but continued pressure of the floating abdominal *viscera* on the *fundus* of the *uterus*; either on its anterior or posterior part, according to the species of obliquity it has taken; so that this pressure sometimes occasions the *anteversion*, and sometimes the *retroversion*. It is by the same mechanism that both kinds take place suddenly; but that requires a stronger impulse, and that impulse may be given by the action of the abdominal muscles, or by external

* The *retroversion* of the *uterus* took place completely in an instant, in the Marchioness of * * *, on Easter Monday 1784; and from that moment she found it impossible to evacuate a single drop of urine. Being called an hour afterwards, I found the lady in the attitude of a woman just going to be delivered. She was exerting involuntarily the most violent efforts, being stimulated to it by the presence of a body which appeared at the entrance of the *vagina*, of the size of a half-crown, as well as by the necessity of making water. This body was the posterior part of the *uterus*; the *fundus* rested on the *coecix*, and the orifice was raised very high towards the *pubis*. I immediately reduced it, and she became easy. This lady was three months gone with child, and for five or six weeks had been in the state mentioned in par. 247 and 248. She was not delivered till the usual period.

agents. The *uterus* has been sometimes inverted by straining to vomit, at stool, or even to make water; and this inversion has often been determined by a fall, a blow, or a strong compression of the belly*. Some of the accidents produced by this *deplacement* soon add to its first causes, and render it more considerable, as I shall have occasion to remark in par. 261.

256. The accidents which proceed from the *retroversion* and *anteversion* of the *uterus*, depend much less on the degree or extent of the *deplacement* that *viscus* has undergone, than on its volume relatively to the capacity of the *pelvis*. When a healthy *uterus*, and perfectly empty, is inverted in a *pelvis* of the natural size, whether its *fundus* be turned towards the *sacrum* or towards the *pubis*, the woman feels nothing but a

* M. *Choppart* communicated a case to me of *anteversion* of the *uterus*, in a woman two months gone, which seemed to proceed from no other cause than straining to vomit. The *retroversion* seemed to be the consequence of a great fright, in one of the cases mentioned by Dr. *Hunter*; M. *Des Granges* has attributed the first to a strong pressure made on the belly by a basket of wet linen. and, in the lady mentioned in one of the preceding notes, the *retroversion* was determined only by straining to make water, while the neck of the *uterus*, which was without, was pushed back with the finger, as she had done an hundred times in the last five or six weeks.

troublesome weight on the fundament, painful draggings in the groins, the fore part of the thighs, and the loins; and a sort of uneasiness about the neck of the bladder, and the intestine, which excites frequently an inclination to make water and go to stool. These symptoms augment in proportion to the efforts the woman makes to overcome the obstacles which oppose the evacuation of the urine and *æces*. If the former with a great deal of pain be established, it is sustained with difficulty, and appears often interrupted.

257. These accidents are manifested the moment the *uterus* is inverted, when it is plethoric and tumefied, or when its volume is augmented by pregnancy; because it then acts with more force on the neighbouring parts, and is itself more incommoded. If the painful draggings which we have just mentioned are not more troublesome in the latter case than in the former, the weight on the fundament and on the neck of the bladder is greater; the uneasy sensations in the bladder and *rectum* are stronger; the difficulty of making water and going to stool is more considerable; and, according as the *uterus* is more or less voluminous relatively to the cavity of the *pelvis*, there is a complete or partial retention of urine, and an absolute constipation.

258. The accidents increase to this degree in a very short time; and are very quickly aggravated by new ones, when the *uterus* is completely inverted in the third or fourth month of pregnancy: because its length from the *fundus* to the orifice equals, and even surpasses, the distance from the *pubes* to the *sacrum*; which causes it to compress strongly the neck of the bladder, the *urethra*, and the *rectum*, from the moment of its inversion, and to be itself wedged in a very uneasy manner in the cavity of the *pelvis*. Though the progress of these accidents is rapid in this case, it may be very slow in that where the inversion of the *uterus* takes place gradually, and at a less advanced period of gestation.

259. Let us suppose it to take place before the second month, and to be complete. The accidents at first will be limited to those stated in par. 256, because the *uterus* is still small at that period; but as it is developed daily, notwithstanding its *deplacement*, and as it successively requires a greater space, it will at length more strongly compress the neck of the *bladder*, and the *rectum*, till they both become so far effaced as no longer to permit the discharge of urine, or of the most liquid *fæces*. It may happen, in these circumstances, that the *catheter* can-

not penetrate the bladder, and it may be equally impossible to administer clysters.

260. The *uterus*, already, as it were, wedged in the middle of the *pelvis*, when the accidents are increased to this pitch, is wedged much more strongly in it in the sequel, if we do not speedily effect the reduction. Continuing to be developed, because its contents continue to increase, and not being able to do it according to the order in which that development is made in the common state of pregnancy, it moulds itself to the form of the cavity of the *pelvis*, extending itself towards those parts where it finds the least resistance. The augmentation of its volume, in this latter period, does not depend only on the farther development of the produce of conception; it proceeds also from the tumefaction of its substance, which becomes full and inflamed. As the space which the *uterus* then occupies is greater than the superior *strait*; as it completely fills that space, and even finds itself compressed there; the reduction of it becomes extremely difficult, and may even be impossible; because the length of its diameters exceed those of the superior *strait**.

261. The

* In one of the interesting observations of Dr. *Hunter*,
inserted

261. The retention of urine, and constipation, which we have hitherto considered only as accidents proceeding from the *deplacement* of the *uterus*, soon become, as it were, additional causes which concur with the others so as to render it more considerable, and also to oppose its reduction; but it is only in that species called *retroversion*. The bladder cannot be greatly distended, and rise into the cavity of the abdomen, without bringing the neck of the *uterus* forward, and drawing it towards the upper part of the *pubis*, nor without acting on the body of that viscus, already depressed towards the *sacrum*, at least with a force equal to the weight of the urine it contains; and that weight may amount to more than ten or twelve pounds in some cases. The *fæces*, retained and accumulated in the upper part of the *rectum*, above that portion of the canal which

inserted in the fourth and fifth volumes of the Medical Observations of London, we find that the *uterus* could not be reduced; that the woman, very weak when that physician saw her for the first time, died the next day; and, on opening the body, the *uterus* was found so wedged in the *pelvis* on all sides, that it could not be disengaged from it, till the *symphysis* of the *pubes* was divided, and the bones considerably separated. The parts designed and engraved, in all the necessary views, are not the least valuable of those which formed the beautiful collection of Dr. Hunter.

is obliterated by the *fundus* of the *uterus*, act in the same manner, and press that part lower and lower. Add to that, the impulse which those *faces* receive every moment from the intestinal action; and the efforts, often involuntary, which the woman exerts, to make water, or go to stool.

262. These causes do not act so unfavourably in the case of *anteversion*; for they seem rather to concur in restoring the *uterus* to its natural position than in removing it farther from it; which may be easily perceived by the slightest attention to what is stated in the preceding paragraph,

263. Although the above-mentioned accidents are so many symptoms of those *deplacements* of the *uterus* called *retroversion* and *anteversion*, they cannot however serve to establish the diagnostic of them; because there is not one of them which may not depend on another cause. It is only by the touch that we can certainly discover these *deplacements*, and judge of the extent of each species: at a little distance from the entrance of the *vagina*, the finger meets with a pretty solid body, in form of a tumour, which fills the cavity of the *pelvis*; it is that of the *uterus*, which presents its anterior or posterior surface

surface to the touch, according as it is found in a state of *anteversion* or *retroversion*, but always covered by the *vagina*. In the latter the *fundus* resting against the *sacrum*, the orifice answers to the *pubes*; in the former, the orifice is backward, and it is the *fundus* which depresses the neck of the bladder. In either case, if we pass the finger into the *anus*, to a convenient height, we find a tumour formed by the *fundus* or neck of the *uterus*, which depresses the intestine; and the *catheter* introduced into the bladder, when it can penetrate it, demonstrates the same thing*.

264. Though the situation of the neck of the *uterus*, or the relation of its orifice to such or such a point of the internal surface of the *pelvis*, informs us what species of *deplacement* has happened, we must not always judge of its extent by the height of the orifice, and the degree of difficulty we find to reach it with the finger.

* This tumour has been sometimes taken for an encysted stone, or for a scirrhus tumour of the *parietes* of the bladder. M. *Levret* informs us that he was not acquainted with the species of *deplacement* which we call *anteversion*, till the opening of a woman who died in consequence of being cut with intent to extract a stone which was thought to be encysted.— See the remarks of that celebrated accoucheur, on the *deplacements* of the *uterus*: *Journal de Médecine*, tom. xl. p. 269.

Some-

Sometimes it is very accessible, though the inversion is as great as it can be; because the neck of the *uterus* then bends like the neck of a retort, as I have observed in cases of *retroversion*, as well as of obliquity.—See par. 290.

265. The prognostic concerning the *retroversion* and *anteversion* of the *uterus* will be more or less severe, according to the extent of these *deplacements*, their inveteracy, the more or less strict incarceration of the *uterus* in the cavity of the *pelvis*, and the sum of the accidents which it shall have produced. That of *anteversion* is in general, *cæteris paribus*, milder than that of *retroversion*.

266. The essential indication, in all these cases, is to replace the *uterus* in its natural situation, and to keep it in that state. Though we meet with few obstacles to this reduction when the *deplacement* is recent, and the volume of the *uterus* still small, they are very great, and sometimes insurmountable, when it has existed several days or weeks, and the voluminous *uterus* is wedged tight in the cavity of the *pelvis* *. Though the principal indication consists in replacing the *uterus*, as I have just stated, the ac-

* See the case already quoted in the London Medical Observations.

cidents which arise from its inversion sometimes present more pressing indications, and require a treatment which becomes preparatory to the reduction, and without which in many cases it could not be obtained.

267. We begin, in these cases, by evacuating the urine, if possible to do it, either by insinuating the finger along and on one side the *symphysis* of the *pubes*, to remove the body of the *uterus* from the *urethra* and neck of the bladder*, or by introducing a *catheter*. We must also evacuate the *fæces*, if clysters can penetrate and soften what are accumulated and hardened in the upper part of the *rectum*, and the Roman S

* In this manner, I enabled a foreign lady to make water during ten days, in the month of March 1787, and several times a day. She was about three months gone, and the *uterus* was in a state of complete *retroversion*. Not being able to reduce it immediately, I waited in the hope of finding more favourable dispositions. But no longer meeting with the same facility in making the urine flow, and the difficulties becoming greater every time, I determined on the tenth day to overcome all obstacles, by employing a proportionate force. Not to hurt the *uterus* by the immediate pressure of the fingers, I began by insinuating under its *fundus* a very thick pessary of elastic gum, invented by the Sieurs *Durand*, which served after the reduction to fix the *uterus*. This lady did not wear the *pessary* above three or four days, and was delivered at the usual period.

of

of the *colon*. We must have recourse to bleeding, and repeat it as often as the inflammatory state of the parts require; we are to use fomentations and baths, and not proceed to the reduction of the *uterus* till we have prepared it in that manner. Though it has appeared impossible, in some cases, before the use of these means; it has been easily performed afterwards, and even in a manner spontaneously*.

268. The position of the woman which seems most advantageous, when we proceed to the reduction of the *uterus*, is that in which the abdominal *viscera* make the least pressure on it. Therefore it has been recommended to place the woman on her knees and elbows, so that the *pelvis* may be higher than the belly and breast. Though this position is good in some cases, it cannot be looked upon as essentially necessary in all. But it is very necessary that the woman should not make any pressure downwards while we are employed in replacing the *uterus*.

* It is thus the reduction of the *uterus* must have taken place in the woman mentioned by *Smellie*, since he contented himself with evacuating the urine, and the woman miscarried a few hours afterwards. This is not the only example of the kind which I could quote.

269. Reducing the *uterus* to its natural position, is raising the *fundus*, and lowering the neck. To compass this, in cases of *retroversion*, it has been recommended to introduce two fingers into the *anus*, in order to push up the *fundus* of the *uterus* above the angle of the *sacrum*; at the same time that we lower the neck, by means of two fingers of the other hand passed into the *vagina**; which seems difficult to execute, and evidently useless in most cases. We may equally operate the reduction by means of the fingers placed methodically in the *vagina*†. There are instances more favourable than others for obtaining this reduction; but they are subordinate to circumstances which are not in our

* It appears from the first observation of Dr. *Hunter*, and M. *Wall*, that this precept was first given by *Gregoire*, a surgeon of Paris; and many since that time have put it in practice, or have tried it.

M. *Du Saussioie*, surgeon-major of the great Hotel-Dieu of Lion, assures us that he could not reduce the *uterus*, in a case of this kind, without conveying the whole hand into the *anus*, into which it passed, *he says*, without any difficulty.—See the Journal de Médecine, tom. lxxvii. p. 289, for the month of May 1786.

† I have constantly succeeded in this method of reducing the *uterus*; and the *pessary*, mentioned in one of the preceding notes, has been of great service to me.

power;

power; therefore we ought not to be in haste to pronounce it impossible, till we have many times repeated our attempts.

270. We can say nothing here of the force necessary for replacing the *uterus*: sometimes very little is necessary, if well directed; at other times we must use a great deal. The fear of provoking an abortion, in the latter case, ought not to check the operator. Besides that it is not always the consequence of such efforts*, the danger to which the inversion of the *uterus* exposes both mother and child, will be much greater, and more certain, if that *viscus* be not replaced in time†.

271. The reduction of the *uterus* is so important for the preservation of the woman, that Dr. *Hunter*, instructed by experience that it could not be accomplished, in some cases, without first diminishing its volume, has recommended to evacuate the waters of the *amnion*, which are always abundant in the first months of pregnancy, by a puncture through the *va-*

* I could quote more than twenty cases in support of this assertion.

† The observation of *Smellie*, that of *Hunter* already quoted, and many others, prove that this proposition is but too well founded.

gina. This puncture, which is no way dangerous in itself, has not yet been practised with that view; because the case for which *Hunter* recommended it, did not occur a second time in the course of his practice. I do not see that any thing better could be done in so deplorable a circumstance*.

272. The *uterus* being reduced, must be maintained in its natural direction. A proper situation on the part of the woman, and an attention not to press downwards either to make water, or go to stool, have sometimes sufficed for that purpose: but the application of a *pessary* seems indispensable in most cases.

273. The accidents which arise directly or indirectly from these *deplacements* of the *uterus* do not always cease immediately on the reduction's being made; and often afterwards present new indications which must not be neglected: I shall only mention the retention of urine, as an example. It depended at first on the pressure exerted by the *uterus* on the neck of the bladder; but, after the reduction, it may be continued by the inflammation of that part, or by an atony of

* See the Observations of Dr. *Hunter* in the London Medical Observations, vols. iv. and v.

the bladder in consequence of its extreme dilatation. The surgeon must endeavour to discover the cause, and treat it accordingly.

S E C T I O N II.

Of the Obliquity of the Uterus.

274. IF it is extremely difficult for the longitudinal axis of the *uterus* to remain parallel to that of the *pelvis*, during the first months of pregnancy, as I have remarked in par. 241, it seems almost impossible that it should not equally turn away from a vertical line which would divide the body of the woman into two equal parts, when that *viscus*, in a more advanced period of gestation, rises into the abdominal cavity; because it then enjoys a much greater degree of mobility than in the first periods. Its *fundus* generally inclines to one side or the other; and it is that deviation which is called *obliquity*.

275. The authors who have spoken of this obliquity, have established four general kinds of it:—1. An inclination forwards; 2. Backwards; 3. To the right side; and, 4. To the left. One
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of the most celebrated has divided them into others *; and indeed they might be multiplied *ad infinitum*. After the right lateral obliquity, the anterior is the most common; that of the left side is pretty rare; and we may doubt the possibility of a posterior obliquity, which M. *Levret* and his followers only admit when the *lumbar vertebræ* are curved in a direction contrary to their natural state †; that is to say, when their assemblage describes a concavity forwards, instead of that convexity, which has hitherto appeared to me so much the greater, as the woman was more deformed. I have never met with a vicious conformation of that sort; nor can I see any thing in the signs of a posterior obliquity of the *uterus*, described by some authors, more than the signs of an *uterus* “situated vertically to the “inclined plane of the entrance of a well made “*pelvis*,” to make use of the expressions of M. *Levret* ‡.

276. The deviation of the *uterus* was known before *Deventer*, though the discovery of it is generally attributed to him; and that discovery,

* M. *Levret*, L'Art des Accouchemens, edit. troisième, § 283. et suiv. Idem, § 638.

† Idem, § 635.

‡ Idem, § 294; l'Explication de la Planche II. fig. 7.

according to him, has been regarded as that which has produced the most happy revolution in the art of midwifery. *De Graaf*, *Bartholin*, *Amand*, *Mauriceau*, and others, give examples of it. If those authors have explained themselves less fully than *Deventer* on this subject, none of them have deduced such false consequences from it: the moderns have done little more than copy him.

277. If it was believed, at first, that the obliquity of the *uterus* was an effect of its bad conformation, of the relaxation of some of its *ligaments*, and the contraction of others; of certain tumours of the neighbouring parts, or of the habit which many women are in of sleeping only on one side; most authors, especially since M. *Levret*, attribute it to the attachment of the *placenta* to some other part than the *fundus* of the *uterus*. The most common cause of a deviation of the *uterus*, says that celebrated accoucheur, depends on the part of that organ on which the *placenta* is implanted; for if it is not fixed on the *fundus*, or on the orifice, it always draws that *viscus* to the side next which it is attached. The most common cause after this, continues M. *Levret*, is the original or accidental bad conformation of the *uterus*, or of some
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of its parts, or even of those in its neighbourhood *.

278. We may indeed easily conceive how such a mass as the *placenta*, attached a little below the *fundus*, and on the right side, may draw the *uterus* to that side; but we do not perceive so clearly how that mass can determine the same species of obliquity, when it is grafted on the neck of that *viscus*, or on its left side. In the first case, according to M. *Levret*, the *fundus* of the *uterus* inclines to the side where the *placenta* is attached, in obedience to the laws of gravitation; and inclines that way so much the more, as that mass is placed nearer to the orifice †. As it cannot be according to the same laws, that the obliquity is determined on the side opposite to the *placenta*, can it be that the region of the *uterus* to which it is fixed, not being able to develop as much as the others, determines that *viscus* to take a preternatural figure and situation, as the same author pretended ‡? By reading him attentively, we shall see that he insinu-

* L'Art des Accouchemens, edit. troisième, § 633, 634.

† Idem, § 282. Observations sur les Causes de plusieurs Accouchemens Laborieux, edit. quatrième, part. ii. p. 110, et suiv.

‡ Observations sur la Cause des Accouchemens Laborieux, part. i. p. 120.

ates that the defect of development is the cause which obliges the *uterus* to deviate to the side where the *placenta* is ; we shall be struck with the contrast between his observations, and what we see in daily practice ; and we shall see how much M. *Levret* was embarrassed to make facts square with his system.

279. The obliquity of the *uterus* seems to be a necessary consequence of the roundness it acquires in developing ; of the figure and situation of some of the surrounding parts, of the mobility of others, and of the changes which their functions determine in them every instant : but what is the cause which obliges it to incline to one side rather than the other ?

280. If the obliquity were caused by the implantation of the *placenta* in any other part but the center of the *fundus uteri*, it would constantly take place on the side where that mass is found. But we often find it on the opposite side ; and M. *Levret* himself furnishes a proof of it in the second case which he relates from M. *Buzan* : we there see that the *uterus* was very much inclined to the right side, though the *placenta* was attached to the left, and very near the orifice. The *uterus* is almost always inclined to the right side ; and the *placenta* is not oftener attached to
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the right lateral part of that *viscus*, than to the rest of its surface. It was implanted on the posterior part in the case of the greatest anterior obliquity that an extensive practice has hitherto given me an opportunity of seeing; and that is not the only observation of the kind which I could adduce. Twenty times, and more, I have found the *fundus* of that *viscus* as much inclined to the right side, though the *placenta* was attached to the left; and it was not less evident in some of those cases where the center of that mass seemed to be applied over the center of the orifice. The result of these observations is, what all judicious and enlightened practitioners can daily confirm, that the obliquity of the *uterus* does not essentially depend on the connections of the *placenta* with that organ.

281. It would be easy to prove that this mass cannot in any case oppose the development of that portion of the *uterus* to which it adheres, and does not by that means force the *uterus* to take an oblique form, as is asserted by M. *Levret*, nor even any other form than it would have acquired in developing, if the *placenta* had struck its roots in the middle of the *fundus*. All authors agree that the place where the *placenta* is engrafted is thicker than other parts; but they

add that the *uterus*, in that same part, is softer, more spongy, and more humid. M. *Levret* has not a different opinion of it; for he expresses himself thus, § 279: “When the *placenta* attaches itself to the *fundus* of the *uterus*, that part of it preserves a great deal of thickness, notwithstanding its prodigious extension at the latter end of pregnancy.”

282. We cannot mistake, in the direction of the axis of the *pelvis*, the cause which throws the *fundus* forwards, and causes the anterior obliquity. It would be much more difficult to explain why that obliquity does not always exist, if we were less acquainted with the natural resistance of the coverings of the belly, by which the *uterus* is supported after the first periods of pregnancy. The inclination of the superior *strait*, in a well formed *pelvis*, being so great, that it has been thought it might generally be estimated at from thirty-five to forty degrees; and the axis of that *strait* being inclined as much, though in the contrary direction, since it descends nearly from the *umbilicus* to a little above the point of the *sacrum*—the *uterus* cannot rise through that *strait* but by inclining forward, and leaning against the abdominal muscles; which afford it so much the less support,

port, as they have been more weakened by former pregnancies, and as they are naturally of a looser texture. Therefore we observe that the anterior obliquity, always small in a first pregnancy, becomes greater in a second, to whatever part the *placenta* may adhere; and augments thus every time the woman becomes pregnant: so that the belly falls on the thighs, in form of a wallet; descends even as low as the knees, in women who are very small; and, both in them and others, has need of being supported by a *suspensor* *.

283. It will perhaps appear more difficult to assign the true cause of lateral obliquities. I am inclined to think they are determined by the relation of the *uterus* to the *rectum*, and the Roman S of the *colon*; by the anterior convexity of the lumbar column, and the situation which the small intestines take relatively to the *uterus*, which lifts them up, in proportion as it advances in the abdominal cavity.

284. The relation of the *uterus*, developed

* I have seen this degree of anterior obliquity of the *uterus* at least ten times, without its having made delivery more difficult. I have seen in a deformed woman, on whom the Cesarean operation had been performed, the *fundus* of the *uterus* descend to within an inch of the knees, in two subsequent pregnancies, as early as the seventh month.

and

and rounded in its body in the second or third month of pregnancy, with the *rectum*, which forms a sort of winding column along the *sacrum*, is such that those two parts cannot touch but by convex surfaces, and consequently by very few points, like two balls. Now, if we allow the *uterus* the mobility which it really enjoys in the midst of the *pelvis*, we shall be forced to agree that the center of its posterior convexity cannot remain constantly against the convexity of the anterior surface of the *rectum*, which on each side offers its planes so much the more inclined, as it is then, though momentarily, more dilated by the *feces*. This salient point of the posterior part of the *uterus* will then turn away, and place itself on one of the sides of the *intestine*; which cannot take place without removing the middle of the *fundus* from the axis of the *pelvis*, and inclining it towards one of the lateral parts. If the *rectum* descended in a right line from the middle of the projection of the *sacrum* to the point of the *coccyx*, the space being equal on each side, the *uterus* would be equally subject to incline to either, and we should not see the right lateral obliquity oftener than the left; but being placed on the left side of the base of that bone, and leaving its curve less free on that side than

on

On the right, the posterior convexity of the *uterus* is almost always directed towards the latter, and the center of its *fundus* inclines that way preferably. This first degree of obliquity, which depends entirely on the relation of the form of the body of the *uterus* to that of the intestine, during its stay in the *pelvis*, is easily discovered by the touch, in most women, after the second or third month of gestation; the orifice of the *uterus* being from that time lightly turned to the left side of the *vagina*, and much more manifestly from the third to the fourth month.

285. The accumulation of *feces* in the *rectum* and the extremity of the Roman S of the *colon*, and the direction of the course they must take to pass out, are additional determining causes of the right lateral obliquity of the *uterus*; since they press that *viscus* from left to right, and with so much the more force as that which expels them is itself greater. We might even assert that they impress on the *uterus* a slight rotatory motion, which would tend to carry its left lateral part towards the fore part of the *pelvis*. (See par. 292.) —Roëderer had nearly the same opinion as I have on the determining cause of the obliquity of the *uterus*, which he attributed partly to the compression which that *viscus* suffers from the *feces*

feces contained in the *rectum*, and in the left part of the *colon* * : and *Solayres* has clearly explained the mechanism of it †.

286. These causes acting almost always in the same manner; and not being able to act otherwise, at least without a vicious conformation, a transposition of the Roman S of the *colon*, and of the superior extremity of the *rectum*—we ought not to be surprised that the *fundus* of the *uterus* inclines so often to the right side, and so rarely to the left. Every attentive observer may in fact remark, that the right lateral obliquity is so frequent, and the left so rare, that perhaps we should be far from establishing the due proportion of one to the other, by saying that the latter is scarcely met with once, where the former is an hundred times. As the left lateral obliquity cannot depend on the same mechanism, nor on the attachment of the *placenta* to the side of the *uterus*, what must then be the determining cause of it? We can only attribute it to the concurrence of some of the accessory causes hereafter mentioned.

287. The *fundus* of the *uterus*, already a little

* Roëderer, Elem. Art. Obs. § 450.

† Solayres, Dissert. de Partu Viribus Maternis absoluto, § xi. De Utero Obliquo.

inclined,

inclined, as observed in par. 284, cannot afterwards rise in the abdominal cavity, but in an oblique direction: so that the small intestines are obliged to give way to it, and go towards the left side; to which, according to the disposition of the *mesentery*, they seem to have a more natural inclination.

288. The convexity of the lumbar column very much favours the lateral obliquity; and might determine it, exclusively of any other cause, if it did not already exist, in a slight degree, before the *uterus* is raised above the superior *strait*. That *viscus* growing rounder and rounder, without losing any of its mobility, in proportion as its contents augment, cannot rest on that column, which offers it, on each side, spaces much better adapted to its figure. Supposing then that it has risen above the superior *strait*, till the fifth month of pregnancy, without turning away its axis from the axis of that *strait*, it would still be forced to change its direction, and incline to one side; because the greatest convexity of its posterior part, which would then answer to that of the second and third *lumbar vertebrae*, could not rest on that point: it is in this manner that the left lateral obliquity must happen, when no other cause determines it accidentally.

cidentally. This explication is so clear, and so equivalent to a demonstration, that it must appear astonishing that any one should still refuse to admit the convexity of the lumbar column, as a determining cause of the lateral obliquity of the *uterus*; which besides contributes not less to the anterior obliquity.

289. The attachment of the *placenta* to one of the sides of the *uterus*, and the habit some women have of lying always on one side, are but accessory causes to those I have just stated, and the lateral obliquity may take place independently of them; since it has been often remarked on the side opposite to that where those causes should have determined it, according to the authors who have mentioned them.

290. It is by examining and feeling the belly of the woman that we form a certain judgment of the species of obliquity which exists, and of its extent, though it is sometimes apparent to the sight. The deviation of the neck of the *uterus*, according to which some authors seem to decide, may lead us into error. Not only its orifice is not always turned towards the side opposite to the obliquity of the *fundus*; but I can also assert, from experience, that its deviation, however great it may be, is not constantly a sign of obliquity,

obliquity, and that it may exist independently of that ; as I have observed it on account of accidental vices of the *parietes* of the *vagina*, and on account of bridles or *cicatrices*. I have many times found the orifice applied exactly against the *ossa pubes*, in women who had the *fundus* so much inclined forwards, that the belly, in form of a wallet, was obliged to be supported by a kind of *suspensor* ; I have much oftener made the same remark on account of the right lateral obliquity, in women where it was very considerable, though the orifice was situated near the *ischium* of the same side : so that we may safely pronounce that the neck of the *uterus*, in many cases, is curved like that of a retort, as M. *Levret* and others have asserted before me.

291. Experience also proves that we may, at will, change the situation of the *fundus* of the *uterus*, by causing the woman to take a different position, while the neck of that *viscus* remains fixed against the same point of the *pelvis* ; unless, by means of the finger passed into its orifice, we draw it to another part.

292. By changing the situation of the *uterus* in the manner just mentioned, it is made to undergo a small twist towards the union of its neck with the *vagina* ; because its *fundus* cannot pass from

from one side of the belly to the other, without in some measure rolling on its longitudinal axis, and on the fore part of the lumbar column. It is this twist, sometimes sensible to the touch, that some accoucheurs have taken for an indication of middle obliquities between the lateral and anterior; but they have deceived themselves. Nor is it a more certain sign of the attachment of the *placenta* between the origin of one of the *tubes*, and the middle of the anterior part of the *uterus*, as M. *Levret* imagined.*.

293. The obliquity of the *uterus* is in general of much less consequence than is commonly said. It would be a scandal to the art to look upon it

* It is not only in those cases where we thus change the situation of the *fundus* of the *uterus*, that it seems to roll on its axis in passing over the lumbar column; if it does not execute the same rotatory motion every time it inclines to one side, from whatever cause, at least it does it in some circumstances. The incision in the *linea alba*, in one of the two Cæsarean operations which I have performed, shewed us under its superior angle the insertion of the left tube, and of the round *ligament*: therefore the *uterus* had rolled on its axis. It is from this same motion that the incision of the *uterus* in other cases, where the abdomen was opened laterally, has been found to be along the posterior part of that *viscus*, passing above and near the insertion of the *tube*. This observation may be of great utility; and I shall have occasion to apply it more than once, in treating of the mode of operating in difficult labours.

at present, with *Deventer*, as the most usual cause of difficult and preternatural labours: they are extremely rare; and the obliquity is so frequent, that perhaps there is not one woman in an hundred in whom it is not perceptible. When it is but slight, or even moderate, far from obstructing delivery, it seems to favour it; which I shall explain in treating of the mechanism of that function. It is only when it is extreme that it can oppose it; but it is always so easy to correct it, and prevent its consequences, that we might, with some reason, attribute them as much to the ignorance of the accoucheur, as to the obliquity itself. If the effects of it have been dangerous to some women and children, it was because the operator wanted skill to prevent them, or the man of science was called too late to repair them. We must allow too that it would not be less dangerous to follow literally all the precepts which have been given on this point.

294. There is, in fact, no accoucheur a little in vogue, who must not have observed, a thousand times, that the greatest obliquity of the *uterus* does not constantly disturb the mechanism of labour, nor always render it more tedious. I have assisted a great number of women who have been delivered in a few pains, though

the *uterus* was so inclined forward, that the belly, like a wallet, fell down to the knees when they were standing; others have had a longer labour, but have not been less happily delivered: the same observation has been often made on account of lateral obliquities. The suppleness of the child, the facility with which it bends itself in all directions, and accommodates itself at the same time to the direction of a very inclined *uterus*, and to that of the *pelvis*, would suffice to explain these great truths, if thousands of facts did not place them in the clearest light.

295. If it is no longer permitted to believe, with *Deventer*, that the obliquity of the *uterus* is the most usual cause of difficult labours; that in consequence of them the child's head must strike and be crushed against some part of the margin of the *pelvis*, or be wedged in the curve of the *sacrum*, according to the species of obliquity which has taken place; if we cannot admit all that M. *Levret*, and so many others after him, have thought of the deviation of the *uterus*, we must nevertheless confess that it merits the greatest attention, and that the consequences of it might be often disagreeable if not attended to in time. I shall now state some of its principal effects.

296. We may, with *Roëderer*, look upon it as one of the causes of those troublesome pains which incommode women in the latter periods of gestation, especially about the groins, the fore part of the thighs, or towards the loins; but those pains, as well as others, may exist independently of that cause.

297. When the obliquity is considerable, the neck of the *uterus*, commonly applied against some part of the sides of the *pelvis*, opens with much more difficulty than if it answered to the center of the cavity, because the forces which tend to open it are then directed in such a manner as to be partly lost on the side of the *pelvis*; which renders the labour longer and more laborious.

298. In this case, if the membranes break early, if the action of the auxiliary powers is pretty strong, and the *pelvis* large, the child's head presents itself to the *vulva*, covered by a portion of the *uterus*, which it has extended and forced to descend before it, while the orifice is carried farther and farther backward; which produces much greater accidents, if the accoucheur does not prevent them in time, by checking those efforts which depend on the will of the woman, by pushing back the child's head a little in the interval of the pains, and by draw-

ing the orifice of the *uterus* under it, and towards the center of the *pelvis*, and maintaining it in that situation. The two following cases appear to me very fit to demonstrate the disagreeable consequences of obliquity of the *uterus* in such circumstances, and the salutary effects of the conduct which I recommend. One of these cases is extracted from a memoir on the obliquity of the *uterus*, which was communicated to the Royal Academy of Surgery by M. *Bavai*, surgeon-accoucheur in the states of *Brabant* *; the other happened under my own care.

CASE I. A woman of the village of *Grimberg*, near *Brussels*, pregnant of her first child, not being able to have M. *Bavai* at the beginning of her labour, had recourse to a midwife who kept her standing, and made her bear down, whenever a pain came, during three days and two nights; so that the child's head appeared at the *vulva*, enveloped in the anterior part of the *uterus*, when this surgeon was sent for again. This portion of the *uterus*, which was like a cap on the child's head, was, says he, inflamed; and

* This memoir is nothing but an abusive criticism of what the first edition of this work contains on the obliquity of the *uterus*, and only displays the ignorance of its author.

the orifice, which he could not discover without a great deal of trouble, answered to the superior part of the *sacrum*, and was not open farther than the breadth of a sixpence: the waters had been drained off some days. Recourse was had to bleeding, clysters, and emollient fomentations; and M. *Bavaï*, being scarcely able to keep back the child's head, and prevent it from clearing the *vulva*, enveloped in the portion of the *uterus* which covered it, thought of laying the woman so that the breech might be higher than the shoulders; and notwithstanding that, continues he, a gangrene came on, and the woman expired. Proceeding to open the body in presence of M. *Le Botte*, sworn surgeon of the Abbey of *Grimberg*, they observed that the *placenta* was attached to the middle and inferior part of the anterior *paries* of the *uterus*; that the *pelvis* was well formed, and very spacious; that the orifice of the *uterus* answered to the nape of the child's neck, the head having come out enveloped in a portion of that *viscus*, which was gangrened and separated from the rest. This case, in which I have in some measure preserved the expressions of the author, presents, in a clear and alarming manner, the melancholy effects of an obliquity of the *uterus*, when the

woman is left to herself, or committed to the hands of blind and temerarious ignorance. The following, on the contrary, demonstrates what we may expect from the assistance of art, when well directed. I have chosen it from among many which have fallen within my own observation, because it is impossible that any one can be more similar to that of M. *Bavai*.

CASE II. Towards the end of the year 1773, a woman, robust and well made, and who had already had several children, presented herself to be delivered in presence of my pupils; and by her obstinacy procured them an opportunity of observing perfectly the effects of obliquity of the *uterus*, when it is not corrected seasonably, as well as what may be expected from the timely application of the precepts of the art. The *uterus* in this woman was manifestly inclined to the right side, and forward, so far, that its orifice, turned backward, was difficultly discovered by the touch. The waters broke away, and her pains were strong and frequent: the child presented well. Nothing could convince this woman of the necessity of remaining in an horizontal position, and of supporting the presence of the finger; she went on, sometimes sitting and sometimes standing, giving herself

up inconsiderately to the most violent efforts, whenever she felt a pain ; so that, after twelve or fifteen hours labour, the child's head appeared to occupy the lower part of the *pelvis*, covered by the anterior and inferior part of the *uterus*, so much that it might be perceived in that state by separating the *labia*, and opening the entrance of the *vagina* a little. The finger passed over the whole spherical portion which presented itself in that manner, without finding the orifice, which was then thrown more backward, and as high as at the beginning: it was necessary to insinuate the finger almost to the base of the *sacrum*, to touch its anterior edge. The portion of the *uterus* pushed forward, and forming under the child's head a kind of cap which covered it entirely—more apparent still to the view in the course of labour, because it approached nearer and nearer to the entrance of the *vagina*—was smooth, shining, tense, wonderfully injected, and covered with an admirable net-work of vessels. It became so extremely sensible, that the woman could not bear the slightest touch on it ; and the whole *abdomen*, threatened with the same inflammation, was so painful that her clothes became troublesome. She was in a high fever, and her ideas began to be deranged, notwithstanding several bleedings ;

when a fortunate incident rendered her sufficiently docile to listen to the advice which she had rejected for eight-and-forty hours, and to suffer the treatment which we would have put in practice from the beginning. Intimidated by the unexpected appearance of two men of the law, dressed in their robes, she laid herself on the bed: I raised up the belly with one hand, to diminish the obliquity of the *uterus*; while with two fingers of the other, after having pushed back the child's head a very little, I was able to hook the anterior edge of the orifice, to bring it towards the center of the *pelvis*, where I kept it during a few pains; and then permitting the woman to bear down with the little strength she had left, she was delivered in the space of a quarter of an hour. Her child was healthy, and the subsequent symptoms were very simple. If this case were not sufficient to confirm the utility of this practice, I could support it with many others.

299. In women who have the *pelvis* rather narrow, the head, thus covered by a portion of the neck of the *uterus*, does not descend so low as in others; but in all, as the efforts which tend to push the head forward act perpendicularly on the portion of the *uterus* which covers it, that portion is distended, inflames, and tears, if we
do

do not prevent those effects by correcting the obliquity of the *uterus*; and, if that be not sufficient, by bringing the orifice to the center of the *pelvis*, and keeping it there till the head be engaged in it; as I have just recommended.

300. To prevent these effects we must then lay the woman on the side opposite to the deviation of the *fundus*, in order that the *uterus*, charged with the weight of the child, may incline that way; and to this precaution we may sometimes be obliged to join that of pressing the belly to that side with one hand. We must moreover, in an extreme anterior obliquity, recommend to the woman not to bear down; because those efforts would become contrary to the end proposed, and would only augment the obliquity. If the orifice, by means of these precautions, does not approach the center of the *pelvis*, after waiting a proper time, we must bring it thither with the finger during the absence of the pains, and keep it there till it be sufficiently open to allow the membranes with the waters to engage in it like a wedge. I can assert with confidence that the length of labour, in many cases, proceeds from the want of this favourable relation of the orifice of the *uterus* to the *pelvis*; and that the most certain means of accelerating the labour, and sparing the woman a great

great number of useless and fatiguing pains, consists in establishing that relation, in the manner I have just recommended. There is nothing to be feared from this procedure : it cannot produce a rent, nor inflammation of the neck of the *uterus*, nor flooding, &c.

301. The effects which I have just stated are not the only ones which may result from an obliquity of the *uterus*. The longitudinal axis of the child, always parallel to the longest axis of that *viscus*, cannot at the same time be parallel to that of the *pelvis*, in an extreme obliquity, which produces another kind of obstacle to delivery. For example, in an extreme forward obliquity, it is often one of the sides of the head which presents at the superior *strait*; the ear resting above the *pubis*, and the sagittal suture lying in the direction of the length of the base of the *sacrum*. In great lateral obliquities it is sometimes the forehead, and sometimes the face or back of the neck, which presents; as we shall see in the third part of this work, which treats particularly of preternatural labour. We shall there also mention, as well as in the fourth part, many other accidents which likewise proceed from the obliquity of the *uterus*, and which we could not include in this article.

C H A P. III.

*Of the Menses; of Fecundity and Sterility; of the Signs of Violation, and those by which we commonly judge that a Woman has been lately deli-
pered.*

S E C T I O N I.

Of the Menses.

302. **T**HE *uterus*, before the age of puberty, receives no more blood than is necessary for its nutrition and growth; but, from that age to forty-five or fifty years, it suffers a periodical sanguine *plethora*, which is followed by a depletion more or less abundant, known by the name of *menses*.

303. Almost all women are subject to this evacuation; the derangement or suppression of which, except during the time of gestation, or giving suck, seldom fails to injure their health.

If there are some women to whom nature has refused it, there are few who do not periodically suffer some other evacuation, which in some measure supplies the place of the proper one, as far as respects their health. In some there is a discharge of blood from the nose; in others from the *puncta lachrymalia*, from the ears, from the nipples, &c. I knew a woman of seven or eight and forty, who from the age of fifteen had been regularly attacked monthly by a vomiting and purging, which lasted three or four days. She never had the *menses*.

304. The first and last appearance of the *menses* are sooner or later, according to the constitution of the woman, her manner of life, the country she inhabits, and an infinity of other circumstances. In our temperate climate, this evacuation begins about the twelfth or fourteenth year, and ceases between the forty-fifth and fiftieth.

305. It is not, however, extremely uncommon to meet with women who have had their *menses* sooner, or in whom they have ceased later. In some they appear even from infancy, and in others they have continued to an extreme age.

306. In a well-constituted woman, the duration of this evacuation, and its periods, are almost

most invariable ; but there are differences in each individual. In some women the blood flows during six or eight days, in others only three or four, or even less. So there are some who menstruate every twenty-seven, eight, nine, or thirty days; others twice a month; and many only every six weeks or two months, and even feldomer. But there are very few who, like her mentioned by *Deventer*, have this evacuation only during their pregnancy*.

307. It is impossible to know the exact quantity of blood each woman loses every month, because the quantity is not the same in all, and because a great number of circumstances may make it vary : it is generally estimated at from three to four ounces.

308. As it is more easy to judge of the nature of this blood, we may affirm that it has not those noxious qualities which some have attributed to it. If it does not always appear so pure as that drawn from other parts of the body, it is because it is mixed with the humours of the *vagina*, or is corrupted by its continuance in that canal, or in the cloths which receive it.

309. The *menes* do not always come red at

* *Deventer*, Sur l'Art des Accouchemens, chap. xv.

first; sometimes they begin by a discharge of *serum*, and finish in the same manner. Often also, in girls, they are preceded by acute pains, which, on account of their seat and nature, might make one think they are similar to those which succeed delivery, which are commonly called after-pains. The cause of both seems to be the same: all these pains depend on the fulness of blood in the *sinuses* of the *uterus*, and the difficulty which it finds to escape.

310. The source of the blood of the *menfes* is at present well known: we know that it distils from those openings which we observe in the whole extent of the cavity of the *uterus*, in the neck, and perhaps from the *vagina*. If there still remain any doubts on this subject, it is about what kind of vessels furnish it; for some maintain that it comes from the arteries, and others assure us it is discharged from the uterine *sinuses* or veins. For my own part, I think it comes from the uterine *sinuses*.

311. We know not the cause of the periodical return of the *menfes*. Most authors, by attributing it to a *plethora* of the *uterus*, have left us as much to seek as those who have ascribed it to another cause; since they have not determined what causes that *plethora*, nor why it returns
con-

constantly at the same period. Can it depend on the situation of the *uterus*, the distribution of its vessels, &c. as some have imagined?

312. If this evacuation is an astonishing phenomenon, it is not less so to see it stop suddenly never to return, whether at the natural epoch or earlier, without injuring the woman's health; while its smallest derangement, before that period, sometimes occasions such an infinity of accidents.

313. The cessation of the *menfes* unfortunately does not always happen thus. They most frequently become very irregular before they arrive at that period: sometimes they are excessive, and sometimes flow in so small a quantity as scarcely to mark the linen: they often appear twice a month, and then stop for six weeks or more.

314. The time of the cessation of the *menfes* is often justly called the critical time of women; for a very great number, overwhelmed by the infirmities which then attack them, ever after drag on a miserable and languishing life. That epoch is also in some women that of the return of their health, which the continual vicissitudes of this evacuation had constantly deranged.

315. We have seen the *menfes* re-appear seve-

ral months fucceffively, in women of fixty, and in fome meafure revive the hope of a new fecundity. I have feen this phenomenon in a woman of fixty-five: and the fuppreffion of thefe new *menses* occafioned divers accidents which were taken for fymptoms of pregnancy; and the woman lived five or fix months in that illufion, which the augmentation of the *abdomen* feemed alfo to favour, when it was difcovered that fhe was dropfical*.

316. The fertility of women who are entirely deprived of their *menses*, the fuppreffion of that evacuation during pregnancy and giving fuck, fufficiently declare that it is not a depuration, but merely a depletion, and that that blood had a much more precious deftination. It is indeed fo neceffary for the development of the *fœtus* during pregnancy, and for the fecretion of milk after delivery, that the *menses* in thofe two ftates have always been looked as an unnatural evacuation.

317. Experience proves that the children of women who have their *menses* during pregnancy

* This example is not the only one of the kind which I could quote. I have often been confulted on the fame account by much older women.

are born more weak and sickly than those of others*. And most people at this day look upon a wet-nurse subject to this evacuation as a very bad one; but it would be of some importance to convince them of their error, at least with respect to some†.

318. Among the women who are regular during pregnancy, some are so but once, others during the first three or four months; but there are very few who are so later. The greater part of these latter are very sanguine, and lose a great deal habitually; or else they are of a lax and delicate constitution: which it is very essential to distinguish. Though the *menfes* are pernicious to the latter, they are very salutary to the former, at the beginning of pregnancy, when the *fœtus* consumes but a very small quantity of fluid: in them, it is not the evacuation which is to be feared, but the *uterine plethora* by which it is preceded; because, by extending itself to the *placenta*, it might cause it to separate, and produce an hæmorrhage more or less dangerous.

319. This reason ought to induce women to deprive themselves of a small part of their usual

* M. *Levret*, aphor. 237, edit. 3me. M. *Burton*.

† See the article which treats of the choice of a nurse.

quantity of food, when they perceive the symptoms which used to announce the approach of the *menfes* before pregnancy; to take some cooling drink; to avoid exercise; in a word, to abstain from every thing which may augment the force of the blood towards the *uterus*.

320. Although the *menfes* do not commonly appear during pregnancy, their usual period is however distinguished by a fulness of the breasts, a heaviness in the limbs, and the other symptoms which used to denote their approach before. That is the time we ought to chuse to bleed those women, if we would prevent the effects either of an *uterine plethora*, or of that universal *plethora* which precedes the *menfes*.

321. With regard to women of a delicate habit, who are regular during the first periods of gestation, we ought rather to endeavour to strengthen them, than diminish the mass of blood.

322. Some accoucheurs think it important to distinguish this evacuation from that known by the name of flooding; but I cannot conceive a reason for it. For, in fact, why should we trouble ourselves to make that distinction, if, as those accoucheurs declare, they are both contrary to the intentions of nature?

323. Be-

323. Besides, we cannot be deceived in the nature of these two evacuations, except in the first months of pregnancy. The *menfes* come at the usual period, they flow in small quantity, and are announced by slight symptoms; the blood of them is thin and ferous; and the woman finds herself better in proportion as the depletion takes place.

324. A flooding comes on at an indeterminate time, and most frequently from an apparent cause. When it is not the effect of some external violence, of a strong passion, &c. it is the consequence of an universal or local *plethora*. During its continuance the woman is attacked by slight faintings, pains in the loins, and a sensation of heaviness in the *uterus*, &c. The blood is thick, and coagulates more easily than that of the *menfes* which flows during pregnancy, at least unless they are uncommonly copious. In the latter case it comes from the *vagina* and neck of the *uterus*; in the other, it flows from the *uterine sinuses*, which the separation of a portion of the *placenta* has laid open.

325. When the blood flows in small quantity, rest, a regular diet, with cooling and incrassating drinks, always suffice to stop it; but these means are often fruitless, when it flows more abundant-

ly: we must then have recourse to more powerful remedies, among which we ought to be careful not to forget bleeding at the arm, though it is far from being proper in all cases.

SECTION II.

Of Fecundity and Sterility.

326. FECUNDITY is an aptitude in a woman to conceive, and become a mother.

327. A woman does not commonly enjoy this advantage, but when she has her *menfes* regularly; and is usually deprived of it, after the total cessation of that periodical evacuation.

328. Some women have, however, given proofs of fecundity before they were regular: but they were certainly disposed to be so soon; and nature had already, without doubt, wrought the revolution necessary for that purpose. We also know several examples of conception which have happened after the total cessation of the *menfes*.

329. This happy aptitude to conceive depends on the concurrence of several causes: but
it

it is so difficult to judge of them, that pregnancy alone can enable us to distinguish perfectly the woman who enjoys that aptitude, from her who is deprived of it.

330. It is not more easy to pronounce, in many cases, upon the absolute sterility of a woman, which at all times has been looked upon as a just cause for divorce and dissolution of marriage.

331. The ill conformation of the external parts of generation, the want of some of them, or even all; tumours in them; bridles, cicatrices, indurations, callosities, which contract the *vagina*, and obstruct its entrance; and, lastly, the almost total closure of its orifice, offer but uncertain marks of sterility.

332. We may say the same of some diseases of the *uterus*, of its *tubes*, and of the *ovaria*; of the preternatural situation of the *os tincæ*; of the absence of the *menses*, or their too great abundance; of the *fluor albus*, excessive fatness, and the disgust which some women feel for the venereal act, &c.

333. Even if we knew no examples of women who had conceived, notwithstanding some of the vices of conformation which I have enumerated, or though affected by one or more of

the diseases indicated, yet we ought not to regard these vices as so many causes of absolute sterility, since the greater part of them may be destroyed or corrected by the aid of surgery and medicine.

334. We have not only seen many women become pregnant, notwithstanding the natural or accidental narrowness of the *vagina*, but also others, in whom the orifice of that canal opened into the *rectum**, the external parts being entirely wanting. And how often have we cut an *hymen* too dense, indurations and callosities of the *vagina*, enlarged that canal, and extirpated tumours which obstructed the purposes of nature! The examples are too numerous and well known to make it necessary to adduce any one in support of these assertions.

335. There is no apparent and certain cause of absolute sterility in a woman, otherwise healthy, but the total closure of the *vagina*, that of the orifice of the *uterus*, or the privation of some of the parts essentially necessary for generation†.

336. When

* See the examples quoted by *Barbaut*, p. 59; from Mess. *Devigne* and *Vermond* the father; Mess. *Dupuis*, *Puzos*, and *Gregoire*.

† In 1785 I had an opportunity of knowing a woman aged twenty-eight, tall, and of a good constitution, in whom

336. When we consider the great number of women to whom nature seems to have refused the title of mother, though, as well as the desire of having children, she has given them the most favourable dispositions for it, we are obliged to admit hidden causes which oppose it, and which appear impenetrable to the researches of reason.

337. These causes may depend on the husband or the wife, or at least may arise from a certain defect of affinity in their constitutions. Some men have in fact been supposed unfit for generation with one woman, who have had children by another; and *vice versa*.

we could discover no indication of an *uterus*, however far we introduced the finger into the *rectum*, and depressed the *hypogastric* region with the other hand. A very thick membrane, which the repeated efforts for copulation had stretched, seemed to veil the entrance of the *vagina*; and, when pushed into it with the finger, formed a kind of bag, an inch deep.—This woman has most of the inclinations of our sex; she loves hunting, cultivates letters, &c. and has never felt any thing which indicated a retention of the menstrual blood, nor even the necessity of suffering that evacuation. She is married, but does not give herself up to the duties of the female state, which she fills but imperfectly, and without taking any pleasure in it.

SECTION III.

Of the Signs of Violation, and those which indicate that a Woman has been lately delivered.

338. THE crimes of violation, of *infanticide*, and concealment of birth, have appeared so abominable, that the just severity of the laws has at all times punished with death the persons who have been convicted of them; but as, for the most part, these crimes are committed without witnesses, the judges, before they pronounce sentence, order an examination of a woman who declares she has been violated; and of those accused of destroying a new-born child, either by actual violence, or by exposing it to the rigours of the weather, on any pretext whatever.

339. In these cases the accoucheur has need of a great deal of knowledge and discernment, not to expose the lives of the innocent, or cause the culpable to be absolved. The function with which he is charged elevates the man of science, and in some measure equals him to the judge; but it may degrade the ignorant, and cover him with shame.

340. The

340. The negative signs of virginity are not always convincing proofs of violation; even the contusion and laceration of some of the external parts of generation being not exclusively the effects of that crime.

341. The *hymen* is often entire in women who have been deflowered*; and destroyed in others who still preserve that purity and moral virtue known by the name of virginity†.

* It is well known that the *hymen* is not always torn in the first conjugal embraces; and that it has been found entire in some women in time of labour: I can myself adduce two examples of it. The first was in a young lady, more attentive to the public opinion than to that moral virtue which we call virginity, who became pregnant without entirely consummating the venereal act, but merely by having permitted her lover to shed his seed on the interior parts of the *vulva*; as those did who are mentioned by *Mauriceau* in his Observations: at least this lady assured me so. This however is certain, that the *hymen* bound the entrance of the *vagina* very close, and left but a very small opening. Some reasons lead me to believe that, in the second, there had never been a perfect copulation, though she had been married a year, and was just ready to be delivered, when I discovered the *hymen*. This membrane alone supported half an hour all the possible efforts of the last period of labour.

† Many causes may tear or destroy the *hymen*; and none of those causes are more common than an acrimonious *fluor albus*, and a depravity of that sebaceous humour which covers all the parts of generation at the time of birth.

342. Often,

342. Often, also, the recent marks of force which we find in the parts of generation, are an effect of the manœuvres of an ill-minded woman ; and the accused has been no otherwise guilty towards her, but of a refusal. Have we not likewise known girls mutilate the parts, by thrusting in some foreign body, or otherwise, and then cry out a rape, in order to revenge themselves on a timid lover, or rid themselves of one for whom they had no inclination ?

It seems almost impossible that a single man should be able to commit a rape, at least if there be not a great disproportion of age ; or unless he make use of some artifice, as to give narcotics, or other things of that kind.

343. In some cases it is as difficult to pronounce upon the reality of the delivery of a woman accused of concealing it, as upon the certainty of violation : for it is necessary that the examination be made in the first days ; otherwise the traces of delivery becoming similar to other causes, furnish in fact but very doubtful and uncertain proofs.

344. It being possible that the flaccidity of the breasts, the laxity of the teguments of the *abdomen*, the stripes and white shining spots we observe in them, may be effects of excessive fatness,

fatness, an ascites, or a dropfy of the *uterus*, &c. as well as of pregnancy and delivery, how shall we distinguish, after a certain lapse of time, to which of these causes they are owing?

345. The presence of milk in the breasts is not a more certain sign of it, if we judge by that exclusively; since women have produced it after a dropfy of the *uterus*, in the same manner as after a labour, as many authors attest; and especially as some have furnished it merely by a suppression of the *menfes**.

346. The

* I have seen many women produce milk freely by gently pressing the breasts, who all thought themselves with child, but were not, and some of them never had been.—A little girl, eight years old, of the village of Alençon, presents a much more extraordinary phenomenon. Often applying to her breasts the mouth of a child, some months old, which her mother suckled, there came milk enough into them to suckle it herself during a month, according to the testimony of several persons of the village, the mother not being able to do it on account of the soreness of her nipples. This little girl still preserved a good deal of milk of an excellent quality, and expressed it easily by spirits, when she was presented to the Royal Academy of Surgery the 16th October 1783. The same day she milked out more than a common spoonful, at my house, in presence of more than sixty pupils.

This girl, who had none of the external marks of puberty, was deaf and dumb from her birth. She had periodically suffered a discharge of blood from the eyes, during three days in

each

346. The state of the parts of generation, as well internal as external, is not more decisive. The alteration of the neck of the *uterus* and of its orifice*, the augmentation of that *viscus*, the amplitude of the *vagina*, and laceration of the external parts, may depend on causes foreign to delivery. Besides, how many women are there in whom we can find none of these traces eight days after they have become mothers!

347. To decide affirmatively that a woman accused of concealment of birth has really been delivered, besides the concurrence of all the signs I have stated, the presence of the usual *lochia* will be necessary; which cannot be distinguished except in the first eight or ten days. After that time the discharge approaches to omuch to the nature of the *fluor albus*, to which a great number of women are subject, to enable us, without fear of error, to distinguish one from the other, and attribute the discharge rather to delivery than to an habitual disposition of the *uterus*.

each month, from the age of four years to five and an half. Being suppressed at that epoch, her health appeared hurt for several months; when a new sanguine evacuation, which became as periodical as the former, commenced the natural way. These premature *menfes* did not cease till the secretion of the milk.

* See par. 164.

348. The circumstance will appear much more embarrassing still, and much more delicate for the man who is obliged to decide on the state of a woman, if he recollects that the discharge which succeeds the expulsion of those substances which constitute false pregnancies, whether of moles in a mass or in clusters, of which I shall treat by and by, or of collections of a glairy and bloody fluid, &c. is the same as after a common labour; that the tumefaction of the breasts takes place, in both cases, after a few days; and the secretion of milk into them is often excessive. Whence we see with what sagacity, and with what reserve, a judgment ought to be pronounced in most cases, not to oppress the innocent, or absolve the guilty woman.

C H A P. IV.

Of Generation, Conception, and Pregnancy.

S E C T I O N I.

Of Generation.

349. **T**HIS general operation of nature, by which any individual produces its like, is called generation. This act, in animals, always requires the union of the two sexes, and cannot be performed without it; excepting some few who singly enjoy the power of re-producing themselves.

350. But this re-production, is it only the development of a pre-existing animal? And does it come from the father or the mother, or is it formed of the principles furnished by both? In the latter case, what are those principles, and how are they united?—These are questions impossible to resolve, or at least on which I shall risk no conjecture.

351. Nei-

351. Neither shall I lose time in analysing the different systems established concerning generation; but shall content myself with mentioning them very briefly. They may be reduced to two principal ones; that of the mixture of the two seeds, and that of eggs.

352. The first was that of the ancients, who imagined that a woman discharges a prolific liquor in coition, like that of a man. This system, though generally adopted, had its detractors; and some even among the ancients maintained that the liquor in question was no more than an humour secreted by the glands of the *vagina*: in fact, if it came from the *ovaria*, how could it escape during pregnancy? To judge only by the sensation of pleasure, and that kind of *orgasm* which a woman feels in the region of the *fallopian tubes*, at the moment she gives herself up to the pleasures of *hymen*, it seems probable that some fluid flows from the *ovaria* towards the *uterus*; for that sensation cannot be excited by the liquor which the woman emits without, since it is felt by the greater number independently of that apparent emission.

353. M. *De Buffon* has only embellished this first system. According to that learned naturalist, the man and woman furnish equally what

is necessary for generation. Their seed, says he, is nothing but an assemblage of organical particles, extracted from all parts of the body, of which they form, as it were, so many epitomes. These organical particles, which he calls living and active, because of their continual motion, are so shaped and formed, that they cannot unite and assimilate but with the particles sent from the same parts of the other sex; that is to say, that the particles furnished by the eyes of the man, cannot be caught and united but by those furnished by the eyes of the woman; and so of the rest.

354. The formation of the parts of generation, so different in the two sexes, not being explicable by this ingenious system, the author's invention has supplied it, by supposing that the particles sent from one sex only formed the basis of the whole edifice; and that it turned out a boy or a girl, as those particles belonged to the man or the woman.

355. The system of the ancients, mentioned above, maintained itself in full vigour till the discovery of the *vesiculæ* with which the *ovaria* of women are replenished at the age of puberty: that discovery immediately excited the attention of physiologists. It now began to be believed
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that man and all other animals come from eggs; and that all the difference between the viviparous and the oviparous consisted in this—that the one, having hatched their eggs within, deposit their young alive; whereas the others hatch them after they are laid.

356. According to this system, adopted by the greater part of the moderns, the fecundated egg descends into the *uterus* by means of the *fallopian tubes*; but has any one seen it? We may be allowed to doubt it, as well from the structure of the *tubes*, and the relation of the caliber of their internal extremity to the bigness of those little spherical bodies which we take for eggs; as from the numerous experiments of a philosopher who is the wonder of his age *.

357. The partisans of this system, though agreed on the admission of eggs, are nevertheless divided concerning the mode of their vivification. Some have thought that the *fœtus* was ready formed in the egg, and only wanted to be excited by the seminal power of the male; others, on the contrary, that those eggs were only a kind of nests destined to receive one of the little *animalcula* which have been supposed

* The Baron de Haller.

to be discovered in the *semen* by the help of a microscope.

358. The insufficiency of all these systems, and all these hypotheses, for explaining the surprising phenomena of generation, shews but too plainly the depth of that abyss, where the reason of man often wanders, for want of knowing the bounds which nature has prescribed to his intelligence and his researches.

S E C T I O N II.

Of Conception.

359. THE union of the principles furnished by both sexes for the purpose of generation, in the human species, is called *conception*.

360. If this union is not always performed in one of the *ovaria*, it will be agreed, at least, that it is performed there sometimes; since the remains of *fætuses*, and even *fætuses* entire, have been found in them.

361. Those that have been found in the *tubes* prove that conception may take place in them; or, at least, that those conduits serve to transmit the

the

the body, which is the produce of it, to the *uterus*. Children which have been found in the cavity of the *abdomen*, after the rupture of the *tube*, or of the membrane of the *ovarium*, furnish evident proofs of the place where conception is performed ; and those which have been developed in that cavity, and had got thither without any injury to the *tube*, prove much less that it may be performed in them, than that it then had taken place in the *ovarium*.

362. Admitting that it takes place constantly in the *ovarium*, and that the *ovarium* is the first habitation of man, and that the *tube* is only destined to transport the fecundated egg into the *uterus*—ought we not to be surprised that so many eggs get into that *viscus* ; and that the *tube*, whose extremity is so large, and whose internal orifice is so narrow, lets so few of them fall into the cavity of the belly ?

363. Though some women know, as we may say, the very moment of conception, by the internal movements which they feel, the greater part never suspect that they have conceived till after the suppression of the *menfes*. It would be a desirable thing however, in many cases, to have a certain knowledge of that state earlier, that we might not attribute the disorders which

frequently accompany the beginning of pregnancy to other causes ; nor employ medicines not only useless, but sometimes pernicious.

S E C T I O N III.

Of Pregnancy.

364. THE state of a woman who has conceived is expressed by the word *pregnancy* ; that state lasts from the first instant of conception to that of the exit of the body which is the result of it.

365. We may distinguish two general species of pregnancy, relatively to the nature of the produce of conception ; viz. a true, and a false. The first is formed by one or several children ; and the second by a mole, which sometimes is of a kind of fleshy substance, and sometimes *vesicular*, &c. We may also give the name of false pregnancy to those collections of blood, of water, and glairy humour, which are formed in the *uterus*, as well as to the *tympany* of that *viscus* ; because they are always accompanied by some of the rational symptoms of common pregnancy ; because, like that, they occasion a development

lopment of the belly, and may keep the most skilful accoucheur a long time in the greatest uncertainty concerning the true state of the woman.

366. A true pregnancy has received different denominations, according to the place occupied by the child. It is called an uterine pregnancy whenever the child is contained in the *uterus*; a *tubal*, an *ovarial*, or an *abdominal* pregnancy, when the child is found in one of the *tubes*, the *ovaria*, or in the cavity of the *abdomen*. These three latter species are also comprised in the general name of *extra-uterine* pregnancy.

367. An uterine pregnancy is generally formed by one child, but sometimes by several; which has caused it to be distinguished into simple and compound. We may also call it a compound pregnancy, when the child is accompanied by a mole, and when there is already an *extra-uterine* pregnancy existing; which is not without example, though we rarely meet with it.

368. These different species of pregnancy have some signs common to them all, and others which are peculiar to each of them. The former are, the disgust which the woman feels for certain things, strange longings, a spitting, nausea and vomiting, a suppression of the *menfes*, a swelling and tension of the breasts, &c.

369. These symptoms, which are called rational signs of pregnancy, characterize it however in a very uncertain manner; and will appear very equivocal, if we recollect that they have been often observed in consequence of a simple suppression of the *menfes*. The suppression of the *menfes* is not a more certain sign of pregnancy, as their presence is not always a negative proof it; some women being regular during the first two or three months of gestation, others having ceased to be so a long time before conception, and some few being so only during pregnancy*.

370. Though the greater part of these symptoms united, or separate, offer us at most but probabilities concerning the state of the woman who experiences them; the particular signs which I am now going to describe, enable us to discover it from the first months, and to judge of its species, its different periods, &c. It is by touching that we discover all these things.

* I have met with several women who assured me that they had not had their *menfes* periodically except during their pregnancies. Their testimony appeared to me to deserve more credit, because they only applied for an explication of this extraordinary phenomenon. *Deventer* speaks of a similar woman whom he had attended in several pregnancies.—See chap. xv.

SECTION IV.

Of Touching.

371. TOUCHING, considered relatively to the art of midwifery, is not confined to the introduction of the finger into the *vagina*, but comprehends also the application of the hand to the *abdomen* of the woman. It is by the former we discover the state of the neck of the *uterus*, its situation, &c.; but it is by the latter that we must judge of the volume of that *viscus*, of the height of its *fundus*, its obliquity, &c.

372. Touching is one of the most difficult and most essential parts of the art of midwifery. If *Deventer* and *Puzos*, who have given some important precepts on this subject, have left us much to wish for, it was because they knew, as well as many others, that in this article nothing can supply the want of practice.

373. The accoucheur has hardly ever any other guide but the touch: with that he must supply the want of sight, which indeed could be of use to him in very few cases; and even in them the modesty of women seems to refuse it. But it is only after a long experience that we have a right to expect this advantage from touching.

374. Opportunities of practising it occur frequently, especially in great cities, where women are more numerous, and where persons of both sexes dedicate themselves solely to the profession of midwifery. A wish to dissipate doubts often determines women to submit to it; while at other times these researches concern the honour, the health, and even the lives of several individuals. Sometimes it is a woman who fears she has become pregnant in an illicit commerce, who wishes to withdraw herself in time from the public eye, to secure her reputation, who implores information from our knowledge, as soon as her suspicions commence; sometimes a woman whose pregnancy, still doubtful, is complicated with accidents, or accompanied by a disease foreign to it, who, not daring to employ the remedies her state seems to require, desires us to remove her uncertainty; at other times a woman guilty of crimes which merit the extreme rigour, declares herself pregnant, when she hears sentence of death pronounced upon her; lastly, the judges may require our decision on the state of a woman accused of concealment of birth, and *infanticide*.

375. It is by touching that we discover certain affections of the hidden parts of generation; that

that we judge of the size of the *pelvis*, and of its deformities : it is by that we discover pregnancy, its different periods, and the approaches of labour ; that we distinguish the true pains from false, the part of the child which presents, its volume, the turns it makes in descending, &c.

376. To touch with advantage in most cases, and especially in discovering a doubtful pregnancy, in the first periods, we must begin by habituating ourselves to judge skilfully by this means of the natural state of the *uterus* ; for it is the negative signs of that state which conduct us to the knowledge of the others.

377. In order to that, we should begin by touching dead bodies, where we may rectify our knowledge, and correct our errors ; and then touch women not pregnant, in great number, and in different attitudes, to enable us to judge more exactly of the volume of the *uterus*, of the figure and situation of its neck, and of its weight and mobility. But it is only in the largest cities, where schools of every kind are numerous, and in hospitals destined to receive pregnant women, that we find these resources. As all students cannot enjoy these advantages equally, I shall supply them, as much as possible, by dwelling longer on the theory of this important part.

378. Whether

378. Whether we practise touching on the dead body or the living woman, we ought to put the abdominal muscles into a state of relaxation, and evacuate the urine and gross excrements, that we may more easily discover the *uterus*, and judge of its state. These precautions are particularly necessary, when we want to assure ourselves concerning a beginning pregnancy, or certain diseases of the *uterus* and *ovaria*.

379. It is not less essential to anoint the finger well, which is to be used on this occasion. That precaution renders the introduction of it less painful to the woman, and may secure the accoucheur from the effects of a *virus*, whose subtilty might be great enough to introduce itself by the pores, or at least by the smallest ulceration.

380. It is the fore finger that we must use on this occasion ; but we must learn to touch indifferently with the right or left. With its extremity we gently separate the *labia*, then search for the entrance of the *vagina*, and pass it into that canal, following its natural direction till we meet with the *os tincæ*.

381. After having attentively examined the surface of this part, to form an idea of its form,
length,

length, and thickness; of its density, and the state of its orifice—we must agitate the *uterus* a little, in order to judge of its weight and mobility; then we endeavour to fix it between the finger and the other hand applied to the *abdomen*, to form a notion of its length and volume.

382. In order to fix the *uterus* thus between the two hands, we push it up with the finger applied behind the *os tincae*; while with the other hand we depress the *abdomen* below the navel, taking care, by a proper pressure and movements, to clear away the small intestines to the right and left, till we meet with a solid body, which we find to be that forced up by the finger. This body is the *uterus*, whose length we can then estimate easily, either by a habit of doing it, or by its approximation to the *symphysis* of the *pubes*.

383. This is pretty easy to be done in thin women, and still more so in those who have had children; but it is so difficult in those who are fleshy, and are very lusty, that in them we are hardly ever able to fix the *uterus* in the manner described in the preceding paragraph.

384. The natural tension of the muscles and other coverings of the *abdomen*; their voluntary tension in women who have an interest in concealing

cealing their state, and who submit reluctantly to these researches; as well as the sensibility of the subject to be examined, and a fulness of the intestines and bladder—add still more to these difficulties.

385. In these cases we are sooner able to invert the *uterus*, than to fix it longitudinally; which will equally permit the skilful accoucheur to judge of its state, by passing the extremity of the finger over the whole posterior face of that organ; or by fixing the *fundus* against the *sacrum*, as we see it in cases of *retroversion*, and then estimating the distance from the *os tincæ* to the *symphysis* of the *pubes*. We suppose here that the diameter of the *pelvis* is known in the part where the inverted *uterus* lies.

386. None of these procedures can be employed on asthmatic or dropical women, because they cannot remain lying in the situation prescribed, nor support the pressure of the hand on the *abdomen*. As we can only touch them standing, or nearly in that attitude, it is only by the weight and mobility of the *uterus* that we can judge whether it be in a state of vacuity or not.

387. Those accoucheurs who have recommended touching, with a view to discover a beginning

ginning pregnancy, have advised it not to be done till after the third month ; because they imagined it was impossible to discern it sooner. Though it be true that touching, practised before that time, furnishes us only with conjectures ; those conjectures, joined to other circumstances which cause pregnancy to be suspected, characterize it sufficiently to make us suspend the administration of medicines which might disturb its progress, and prove injurious to both mother and child. I have not hesitated to make it the basis of my judgment in some cases where pregnancy was not advanced above four or five weeks, and I have been very seldom deceived by it.

388. Some accoucheurs have thought that we might discover pregnancy by examining the neck of the *uterus* only : assuring us that it is thicker and harder after conception ; that its orifice is close, and situated higher or lower. But we already know what we ought to think of the greater part of these things, which do not manifest themselves till the time when pregnancy is commonly no longer doubtful ; and which suppose a knowledge already acquired, by touching, of the state of that part before conception : for the neck of the *uterus*, like
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the whole habit of the subject, presents individual differences.

389. Since it is the body of the *uterus* which undergoes the greatest changes in the first six months of pregnancy, and the neck does not develop and suffer any alteration till the two last, it is the successive changes of those parts which can inform us of pregnancy, and its different periods; first those which happen to the body of the *uterus*, and afterwards those which take place in its neck*. But as these changes may depend on a cause foreign to pregnancy, and especially those which touching indicates in the first months, there is not, strictly speaking, any certain signs of pregnancy, except the motions of the child.

390. These motions are of two kinds: one depends on the muscular action of the child's limbs; the other is a rolling motion, in which it is entirely passive. In one it moves itself in the *uterus*, and in the other it is moved in the midst of that *viscus*.

391. In the former kind it is sometimes the head, and sometimes the arms or legs, which it moves. These motions take place as soon as the muscles have acquired a sufficient force to

* See par. 196 and following; par. 401 and following.

produce them ; but the mother is not commonly sensible of them till she is gone about half her time. Before that epoch those motions are too weak, and the limbs too imperfect, to strike forcibly against the *parietes* of the *uterus*, which a pretty large quantity of water then keeps distant from them in almost all parts.

392. Delicate and nervous women can however distinguish these motions sooner, as those of a contrary constitution do not perceive them till much later. I have known several who assured me they constantly felt the child move at three months, others a little sooner ; but many when they drew near the period of four months. I have seen others who could not perceive these motions till after the fifth, the sixth, and even the seventh month. In one of these women, whatever we could do, and notwithstanding the very manifest rolling with which we agitated the child in the *uterus*, its motions did not become sensible to the mother, nor to the accoucheur who examined her, till the period of seven months, two months before its birth* : whence
we

* The birth of this child will not appear premature, when we observe that it was very strong, and weighed seven pounds and an half, or thereabouts.

we see that we must not always take the time when those motions are first felt for the period of four months and an half.

393. The rolling of the *fœtus* in the *uterus* is independent of its muscular action; it exists after death, as before; it even seems, in that case, more troublesome to the woman, who complains that a kind of ball seems to her to fall to the side on which she lies. This species of motion depends on that of the *uterus*, and of the woman, and may be excited by the accoucheur.

394. This rolling commences, as I may say, with pregnancy; but it is so weak in the first periods, on account of the extreme lightness of the *fœtus*, that the accoucheur cannot discover it; and, notwithstanding the strictest inquiry, it cannot be perceived till towards the third, or even the fourth month. After that period it is

I was several times in consultation concerning a woman whose pregnancy appeared doubtful to her till the last moment, as well as to the physician who had the care of her health; because the motions of the child could not in any way be perceived; and nothing we could do, even at eight months and an half, could excite them: this child, which was as strong as usual, was nevertheless born healthy. M. *Levret* used to quote, in his private lectures, a case of a woman who felt no motion of the child in two successive pregnancies.

easy

eafy to difcover it, provided that we be prepared for it, by being accuftomed to feek it in women farther advanced in pregnancy.

395. To excite and diftinguifh this rolling, we advance the finger introduced into the *vagina* to the body of the *uterus*, near the bafe of its neck, or as high as poffible, either before or behind; and we apply the other hand over the *pubis*, in order to fix the *fundus*: we then agitate it upward and downward, with the finger and with the hand, till we diftinguifh the movement in queftion; obferving however not to miftake the motion of the *uterus* for that of the child contained in it.

396. In a more advanced ftate of pregnancy, the action of the hand upon the *abdomen* is not neceffary to difcover this rolling motion; becaufe the child, being heavier, falls quicker on the point of the *uterus* from which the finger introduced into the *vagina* had removed it.

397. The woman ought to be ftanding during all thefe refearches, for an horizontal pofition would augment the difficulties; the body of the child then receding from the neck of the *uterus*, in proportion as the woman's breaft is lowered relatively to the *pelvis*. Every perfon will comprehend this rolling motion, and the advantage

of keeping the woman standing while we endeavour to excite and discover it, by considering that after the first months the *fœtus* is specifically heavier than the water which then surrounds it in great quantity, and that it must consequently occupy the lowest part of the cavity of the *uterus*, and fall on it again if we remove it by any kind of agitation.

398. This rolling motion characterizes a true pregnancy as certainly as the movements arising from the muscular force of the child; for a child is the only solid body which can be surrounded by a fluid in the *uterus*, and be moved in it in this manner: but this rolling, in which the child is absolutely passive, does not, like them, demonstrate whether the child be living or dead.

399. A fluctuation should also be a positive sign of pregnancy; since the child is always surrounded by a certain quantity of water. A fluctuation does actually exist; but, as it is far from being so sensible as some pretend, who would dare to flatter themselves that they should be able to distinguish it in the first months? Does it not likewise accompany some species of false pregnancy, in the same manner as the true? and is there any case where it should be more manifest than in the dropsy of the *uterus*?

400. We have then, before the motions of the child are felt, nothing to prove a true pregnancy but conjectures more or less founded; the force of which augments in proportion as we can unite a greater number of these rational symptoms, which have caused doubts concerning the state of the woman.

401. The signs which touching discovers to us, and on which these conjectures are founded, must always be deduced from the state of the *uterus*. In the first two months of pregnancy the body of that *viscus* grows rounder, and seems to sink a little in the *pelvis*, which carries its orifice forward and downward, sometimes also backward and towards the *coccix*. The belly of the woman changes so little at that time, that the vulgar even think it flattens, instead of growing bigger. If it swells, that swelling cannot be referred solely to the augmentation of the *uterus*, but to an inflation of the intestines. This inflation ceases afterwards; and the belly appears no bigger at six months than it is sometimes accidentally at two.

402. In the third month, the *fundus* of the *uterus*, more voluminous, begins to force the intestines upward, and to lift up the *hypogastric* region; because it is then manifestly above the

edge of the *os pubis*. It is then the hand begins to discover it easily, by pressing on the aforesaid region.

403. At this epoch the development of the *uterus* is still so small, that we are obliged to pass the finger into the *vagina* to form a good judgment of it. It does not so far exceed that which the *uterus* sometimes takes in certain morbid affections, that an accoucheur little experienced in the art of touching should have no reason to fear being deceived, in attributing it to one cause rather than to another.

404. When this development is caused by pregnancy, it is observed only in the body of the *uterus*, and the neck has no share in it: the kind of globe felt by the finger introduced into the *vagina*, and which may be distinguished by the other hand applied externally above the *pubes*, is regular in its surface, and has a sort of suppleness. This body, developed by a plethora of its substance, and affected by a chronical disease, is less regular, often unequal, and hard in certain parts. The neck is more or less affected by the same causes, and also altered in its figure.

405. If touching still leaves the accoucheur, whom a proper experience has not enabled to distinguish

distinguish all these shades, in doubt concerning the state of a woman who supposes herself three months gone, he can have no doubt after the period of from three to four months. At this latter period, the *fundus* of the *uterus* rises the breadth of several fingers above the superior *strait*. It rises to within an inch or two of the *umbilicus* in the course of the fifth; and the neck, receding farther and farther from the *vulva*, is carried backward and higher. The *hypogastric* region is then salient, rounded, and tight.

406. In the sixth month the *uterus* rises above the *umbilicus*, which seems less sunk in; the neck begins to enlarge at its basis, and seems a little softer than before.

407. In the seventh, the neck grows still shorter, and becomes less accessible to the touch, because it recedes from the *vulva* in proportion as it is developed; the *umbilicus* is more salient; and the *fundus* of the *uterus*, raised very high above that cicatrix, occupies a part of the *epigastric* region. It is at this period that the vulgar believe the child turns heels over head: if it happen at that time once by chance, we cannot deny that the child may have turned many times before that period. This popular error is a consequence of what the greater part

of accoucheurs have published concerning the primitive position of the child, and the *summer-set*.

408. When we consult these authors, we can scarcely distinguish on what this assertion is founded: some content themselves with admitting this movement, without examining whether they are right or not; while others advance proofs so weak, that they can convince none but minds already prejudiced. What seems to me to have contributed most to accredit this error, is the difficulty of distinguishing the head at the superior *strait* in the sixth month of pregnancy, while we distinguish it so easily in the seventh, and afterwards. But how often do we find it there before the sixth month! and how many observations lead us to believe that the child's head really occupies the inferior part of the *uterus*, in every period of pregnancy*!

409. At the end of the eighth month, the *uterus* approaches so near to the pit of the stomach, in most women, that it is difficult to judge exactly how far it extends. Its neck is almost always effaced; and its orifice so far off, that the finger can scarcely reach it; and, to do it, we

* See par. 416, and following.

are often obliged to carry it as high as the *sacro-iliac symphysis*, right or left.

410. In order to reach so far, we must proceed in the following manner:—The woman being standing, leaning a little backward, and resting her back against something solid, we place the hand open between the thighs, and introduce the fore finger into the *vagina*; so that the radial edge of the middle finger may lie along the *perinæum* and *coccix*, and the thumb against the *pubis*; so that these two fingers and the thumb are at length very distant from each other. By proceeding thus we have advantages which cannot be obtained any other way; because the middle finger pressing upon the external parts of the *perinæum* and *coccix*, forces them upward, and diminishes so much of the depth of the *pelvis*; which permits the extremity of the fore finger to approach much nearer to the superior *strait* than if the hand were placed in any other manner.

411. Some accoucheurs recommend placing the woman on the bed, to touch her in the latter periods; in order, as they say, to bring the neck of the *uterus* to the center of the *pelvis*, by diminishing the obliquity of its *fundus*. But we must not expect any assistance from this precau-

tion ; and it is almost always impossible to reach the orifice in that manner, if it be very high : and it is much better to touch her standing, as I have recommended. We are often obliged to proceed in the same manner in the ninth month, if we want to discover what is going forward about the orifice of the *uterus*.

412. In this last period of pregnancy, the neck of the *uterus* is completely developed, and the edge of its orifice grows very thin in some women, while in others it seems to become thicker. This kind of increase, in that case, arises from an œdematous swelling which may be observed in the whole extent of the *pudendum*, and which spreads far in the cellular tissue of the *vagina* and neck of the *uterus*.

413. It is rare for labour to be many days distant when the edge of the orifice is very thin and soft ; whereas it is often a month or six weeks off when this circle is hard and thick, whatever may be the diameter or degree of its opening. In fact, has not every accoucheur often found the internal orifice of the *uterus* large enough to permit him to touch the membranes with his finger, at seven months and an half, and even sooner, although the woman has not been delivered till the usual time ? But there is no ex-
ample

ample of labour's being so far off when it is thin and soft.

414. The state of the membranes at the orifice of the *uterus* instructs us much more certainly concerning the period of labour. We ought always to look upon it as very near, when the membranes tighten and relax alternately. We may form the same opinion when the body of the *uterus* grows hard suddenly, and then softens and relaxes; and especially when this alternate tension and relaxation are remarked in the edge of its orifice.

415. These changes ought, strictly speaking, to be considered as symptoms of the first period of labour, since they arise from the efforts which the *uterus* makes to disencumber itself of its burden: but this labour is then so slight, that the *uterus* seems only to act in order to try its strength, to dissipate the torpor of its fibres, and prepare them for a more violent exertion.

416. Though all these symptoms constantly announce the approach of labour, they do not so certainly indicate the period of the ninth month; and, to judge of that, we must also attend to the time of the suppression of the *menfes*, and to that of the first motions of the child;

child; to the volume of the *uterus*; to the size and hardness of the head, which we distinguish by the touch, &c.

417. The pains which most women feel in the small of the back, towards the fundament, and in the *uterus* itself; the troublesome weight which some feel on the *perinæum*; the shrinking of the belly; frequent inclinations to make water; the flowing of a glairy or watery humour, whether tinged with blood or not—do not so strongly characterize the end of pregnancy as the symptoms above mentioned.

418. The elevation of the *fundus* of the *uterus* above the entrance of the *pelvis*, as I have assigned it in par. 405, 406, 407, and 409, cannot serve to determine the periods of pregnancy stated in the same paragraphs, but in a woman big with her first child. I must remark that the *fundus* is a little lower, at each of those periods, in a woman who has already been pregnant several times; and I must add that the situation of the child may cause the same difference, it being less elevated when it is placed across than when well situated. We observe likewise that the neck of the *uterus* in its development, in a first pregnancy, changes the form of its inferior part but little, while its base enlarges;

larges ; and its orifice does not open till the development is complete. But it opens much sooner in the subsequent pregnancies, and the *ostinæ* remains thicker in the latter months ; so that experience is necessary, not to be deceived in these signs.

419. I shall say nothing here of the signs which relate exclusively to the other species of pregnancy mentioned in par. 365 and following, nor of the utility of touching in a great number of other circumstances ; I shall treat of all those things in another place, that I may not here interrupt the chain of truths which relate to the same subject.

C H A P. V.

*Of the Produce of Conception, or of the Substances
which constitute Pregnancy.*

420. **T**HE produce of conception is always so small at the beginning, that we cannot positively distinguish what it will be. It is not till its development that it takes a determined form and character. If the result is generally a child and its dependences, sometimes also it is two, or even more ; or only a reddish mass, called a *mole*.

S E C T I O N I.

Of the Fœtus.

421. THE rudiments of the *fœtus* appear at first only as a mucilaginous cloud, in the midst of a little bladder filled with a clear transparent water ; nor is it till after some weeks that it is so far sketched as that.

422. The

422. The illustrious *Haller* assures us that he has observed nothing of the kind in sheep before the seventeenth day ; and that it was not till the nineteenth that he distinguished a mucous *fœtus*, of the size of a small worm, bent like a crescent : which made him suppose that the human *fœtus* is not formed earlier. The observations I have made in practice coincide with that sentiment.

423. I have carefully examined many *embryos* no bigger than an ant ; they were bent forward, as M. *De Haller* says, and enveloped in a mucous cloud. They appeared to the naked eye to have more resemblance to that little bone of the ear called *malleolus*, than to any thing else ; having, like that, one end very thick, and the other extremely slender. Among the women who produced these *embryos*, some thought themselves a month gone only, and others five weeks ; some of them were of the number of those who are generally able to tell the moment when they conceive.

424. I have seen a greater number of *fœtuses* about the size of a wasp. Their head formed more than half their mass ; the eyes and mouth were very plain ; the hands and feet seemed attached immediately to the *trunk*, the arms, thighs, and legs being scarcely visible. Some were of

six weeks, and others of seven, according to the account of the women who conceived them.

425. All these *fætuses*, as well those of a month as those of six weeks, were contained in a kind of *capsula*, as it were spongy, or covered with a very thick down externally. Those of the former were nearly of the size of a middling hen's egg, and those of the others bigger.

426. These species of eggs are composed of two membranes: one external and thicker, on the surface of which rises the down already mentioned; that is the *chorion*: the other internal, thin, and transparent, through which we may see the body of the *fætus* in the midst of the limpid waters it contains; that is the *amnion*.

427. These membranes adhere less together at the beginning of pregnancy than the external does to the *uterus*; on which account, in abortions that happen in the first periods, we often see those membranes separate from each other, and come away at different times. The *chorion* in those cases frequently tears at the orifice of the *uterus*; and the *amnion* containing the waters and the *fætus* immediately escapes, while the former is not expelled till some time afterwards.

428. In this case the woman discharges only a kind of membranous egg, without the least

down upon it; and when the downy membrane comes away, if it be not examined attentively, it is usually taken for a clot of blood, because it is covered by a layer of that fluid.

429. It is doubtless observations of that sort which have made some believe that the egg is not downy at first, and that the *lanuginous* spot does not appear till it has acquired the size of a hen's egg, and the *fœtus* becomes as large as a bee.

430. The development of the *fœtus* is so slow at the beginning, and so rapid afterwards, that nature seems to have no difficulty but in the arrangement of its first lineaments. As soon as it is sketched, its increase is so sensible, from one month to another, and even from fortnight to fortnight, that it is difficult to conceive how such great and wonderful differences could be the work of so short a time.

431. These differences are not however absolutely the same in every individual. We observe, for example, as much variety in the length, bigness, and weight of a certain number of *fœtuses* of five months, all proportions being observed, as in a like number at full time: some are longer, bigger, and heavier; others shorter, thinner, and lighter; so that we cannot exactly deter-

determine how far pregnancy was advanced by the dimensions and weight of the child, as some authors have asserted.

432. The usual length of a child at nine months is from eighteen to twenty inches, and the two extremes from sixteen to twenty-two or twenty-three. Their medium weight, according to the tables of *Roëderer*, is from six pounds to seven and an half. I have seen two of nine pounds three quarters, one of twelve, and another of thirteen pounds: the latter had several teeth well advanced, and others ready to cut; its bulk was so great, that I can scarcely believe there ever were any born of twenty-five pounds, or even fifteen, as we hear related by the good women*. I have seen some also at full time who

* I must remark that the eruption of teeth before birth is not always a consequence of an extraordinary development of the child, nor a sign of a better constitution. Of all the children whose surprising size has made me put them into the scale, the one mentioned here is the only one born with teeth. A woman of rather a feeble constitution was accidentally delivered, at seven months, of two children very delicate, one of whom had two teeth, and the other three: they died within twenty-four hours. The following year she was delivered of another who likewise had teeth; and she assured me that all her children were born so. Another lady had

who weighed but five pounds, others but four and an half, and several of three pounds three quarters. These latter seem more common than those of nine pounds, and grow to as great a size after their birth.

433. According to these observations, we must conclude that there are children of eight months larger and heavier than others of nine, and *vice versa*: notwithstanding that, an experienced accoucheur will not judge them to be of the same term. - There are always marks of immaturity in the exterior of a *fœtus* of eight months, though bigger than another at full time, which we see not in the latter, and which would be too tedious to describe here.

had two children, at two years distance, who came with two incisors in the lower jaw: they lived but fifteen or eighteen months.

SECTION II.

Of the Attitude and Situation of the Fœtus in Utero.

434. THE *fœtus* is always bent forward, having the head inclined on the breast, the arms bent, the thighs and legs in the most perfect flexion, the knees separated, the heels near together, and placed against the breech. If we sometimes find it in another attitude in time of labour, it is only accidentally, and by the concurrence of several causes, which I shall endeavour to explain in the sequel.

435. This natural attitude is not the effect of any pressure of the *parietes* of the *uterus* on the *fœtus*, since we observe it in the earliest periods, when the little *embryo* occupies, as it were, but a single point of that cavity, which would contain five hundred, and more, of the same size. This attitude seems to depend on the *fœtus* itself, and is pretty nearly that of both man and beast, in a state of rest.

436. The *fœtus* thus folded forms pretty nearly an oval body, whose greatest diameter is ten inches,

inches, or thereabouts; and its smallest, which extends from one shoulder to the other, from four inches and an half to six inches at most. This figure, which gave occasion to *Hippocrates* to compare the child *in utero* to an olive contained in a bottle, is extremely necessary to be well known. At the same time that it teaches us that one of the extremities of the large diameter of this oval body must present to the orifice of the *uterus*, to enable it to pass; it shews us the principal cause of preternatural labours, and indicates what we must do in such cases.

437. We should however have but a very imperfect knowledge of the child, with respect to delivery, if it were limited to these general notions. We ought moreover to be acquainted with the structure and dimensions of all its principal parts, and the motions of which they are susceptible; we ought, above all, to habituate ourselves to distinguish the different regions of its surface, by passing the extremity of the finger over them, if we wish to enable ourselves to know them when they present in the course of labour, and to proceed methodically in all cases.

438. The smallness of the child, relatively to the quantity of water which surrounds it, and

to the extent of the cavity of the *uterus*, in the first periods of gestation, seems to announce that it has then no fixed situation; and that it sometimes presents one region of its surface, and sometimes another, to the orifice of the *uterus*. Some considerations on the form of the *fœtus* till towards the end of the second month and an half, on its specific gravity, and particularly that of the head relatively to the rest of the body; on the length of the umbilical cord, and its insertion near the bottom of the trunk—might lead us to believe that in the first periods it lies on its back, resting on the inferior region of the internal surface of the *uterus*. According to these same considerations, which are not a feeble argument against the *summer set*, we may be certain that the head would constantly be at the orifice, if the child were suspended in the midst of the waters by the cord, as some authors have published and represented in their plates.

439. An accoucheur who has long been regarded as the most celebrated in his profession*, has nevertheless advanced, that in the natural order, after the fourth month of gestation, the child is generally placed with the head above,

* M. *Levret*, § 426, et suiv.

the breech below, and the belly forward: while in the latter months we find the contrary; that is to say, with the head downward, the breech above, and the back under the anterior part of the *uterus*.

440. Such was the idea of the ancients on the position of the child, and such is at present the opinion of most moderns. If there is no inconvenience, as some have said, in admitting the movement which they call the *summer set*, I think there is much less in rejecting it. I am of opinion that the oblivion of that error, too much credited still by the professors of the art, may conduct us to more important truths.

441. We find materials to combat the common opinion on this subject, even in the arguments of its partisans. By reflecting on the position which they give to the child till it makes the *summer set*, as well as that they assign it afterwards, we shall see, first, that it is the most inconvenient it can take, and the most difficult for it to preserve two moments together, if by chance it should exist one: secondly, that it is contrary to the structure and relation of its parts, as well as to the laws of gravitation.

442. If we recollect the extreme smallness of the child in the first two months relatively to

the cavity of the *uterus*, the great quantity of water which furrounds it, the mobility which it consequently enjoys, the manner in which it is bent forward, and the excess of the bulk and weight of its head over the rest of its body, we cannot conceive how it can remain during whole months squat, and as it were sitting on the lower part of the *uterus*, and before the convexity of the lumbar column of its mother. If we recollect the oval form which the *uterus* preserves notwithstanding its development, and that in which the body of the child is folded, we shall rest satisfied that the head must occupy the lowest part of the cavity of that *viscus*: for it is the head which constitutes the small extremity of the oval body described by the child; while the breech, the thighs, the legs, and feet at the same time constitute the large extremity; as the lower part of the cavity of the *uterus* forms its narrowest part, and the *fundus* its largest. The position which the partisans of the *summer set* assign to the child's head, after this extraordinary movement, is not less contrary to the relation of the form of the parts. How can we conceive that the forehead, which after this *summer set* answers to the projection of the *sacrum*, should remain against it for several months, while the sides present spaces bet-

ter adapted to its roundness? We shall see in the sequel how excessively rare this position is.

443. If we compare the dimensions of the cavity of the *uterus*, in most women, with those of the oval body formed by the child in the seventh month of pregnancy, the time when the *summer set* is said to be executed, we shall find another argument against this extraordinary movement: for we shall see that the great diameter of the child, placed according to the length of the *uterus*, very much exceeds any of the transverse diameters of that *viscus*.

444. The strongest arguments we can use against the *summer set* are founded in observation. The opening of dead bodies has a thousand times demonstrated that the child's head almost always occupies the inferior part of the cavity of the *uterus*; and it is generally the head which presents to the orifice in cases of premature delivery, at whatever period of gestation it happen. If we have sometimes found the child placed differently, either in opening dead bodies, or in abortions, the proportion of these cases to those where the head presents, is nearly the same as what we observe at full time.

445. Therefore both reason and experience join to prove, that there is no such *summer set* as

has been supposed; that the situation of the child varies continually in the first periods of pregnancy; and that it becomes fixed and constant in proportion to its augmentation, except in those cases where the *uterus* contains an extraordinary quantity of water. In those women, indeed, the child, always preserving the mobility which it had in the first periods of its existence, may turn itself about different ways, even during labour; but it does not however take the position mentioned above, because the more water surrounds it, the more difficult it would be to preserve that position*. The most natural situation for the child, is to have the head downward, placed diagonally over the entrance of the *pelvis*; the *occiput* answering to one of the *acetabula*, and the forehead to the *sacro-iliac*

* I am very sure of the truth of this assertion, because I have remarked, and caused others to observe, these great *deplacements* of the child in the course of labour; particularly in two women, of whom one was at full time, and the other only in the fifth month of gestation. In the former, during a labour of thirty-six hours, the child presented successively, and several times over, the head, the feet, the back, the shoulder, or one of its sides; and, at the instant the membranes burst, the belly, the knees, and a loop of the cord.

It seems to be on account of having observed similar changes of position, that some authors have advised varying the situation of the woman during labour.

junction

junction of the other side. In this state, the breech, the thighs, legs, and feet are above, and inclined to that side of the woman where the *fundus* is carried; so that its longest diameter crosses the spinal column at acute angles.

S E C T I O N III.

Division of the Child.

446. THE surface of the child, considered relatively to our object, might be divided into thirty-four regions, which however I shall reduce to twenty-three. If some of these present themselves more rarely to the orifice of the *uterus* at the beginning of labour, they on that account require more care and attention on the part of the accoucheur, who, less habituated to know them by the touch, might confound them with others, and err in the consequences he should deduce from them.

447. As it will be necessary, and even indispensable, to detail these different regions in the third part of this work, where I treat of preternatural labour,

labour, I shall say nothing of them here, that I may avoid tedious repetitions.

448. Of all the principal parts of the child, considered with respect to labour, the head must be allowed to be not only the most solid, but also the most voluminous. If the breast, in its natural state, appears larger in some directions, its structure is such that it always accommodates itself more easily to the mould of the *pelvis*: in fact, nothing can be more versatile than the frame of the child's trunk, as well from the number of pieces of which it is formed, as from the flexibility of each, their arrangement, and the manner in which they are connected.

449. We also observe something similar in the structure of the head, since it is likewise composed of a great number of bony pieces, which are united only by membranous parts, which permit them to approach each other, or recede a little, according to circumstances. Thus the head, by means of this disposition, and the flexibility of the bones of the *cranium*, can mould itself, in some difficult labours, to the figure of the *pelvis*. But we must observe that, as it diminishes in one direction, it almost always augments in another.

450. Although the child's head, at the mo-

ment of birth, be somewhat of an oval figure, we may however distinguish in it five regions, two extremities, four diameters, and two circumferences.

451. Of the five regions of the head, two form the summit and base, the three others the sides and the face.

452. One of its extremities is superior and posterior; we call that the *occipital*, or *vertex*: the other is anterior and inferior, which is the *chin*. The first is thicker and rounder, the second narrower and longer.

453. The largest diameter of the head, the length of which is usually five inches and a quarter, passes obliquely from the *symphysis* of the chin to the posterior extremity of the *sagittal suture*; the middle diameter, which is about an inch shorter, extends from the middle of the forehead to the top of the *occiput*; the third passes from the summit of the head to the base of the *cranium*; and the fourth from one *parietal* protuberance to the other. The length of these latter is pretty constantly three inches and from four to six lines. It is proper to remark, that the breadth of the head is less below the ears than in the part indicated for the fourth or transverse

verse diameter*; although many persons, without giving themselves the trouble to examine it, maintain the contrary.

454. The largest circumference of the head is nearly from thirteen inches and an half to fourteen or fifteen inches; the other is only ten or eleven. The latter passes transversely over the middle of the summit and base of the *cranium*, as well as over the *parietal protuberances*: the first, over the two *fontanelles*, the face, the chin, the *occipital foramen*, and the *tubercle* of the same bone; in a word, over the extremities of the oblique and longitudinal diameters, and over those of one of the two small diameters.

455. When the head lengthens in labour, it is always in the direction of the oblique diameter; so that the point of the cone which it then represents, is above the posterior angle of the *parietal* bones: but it cannot undergo this lengthening without diminishing in thickness from

* I shall hereafter call the first of these diameters *oblique*; the second, *longitudinal*; the third, *perpendicular*; and the fourth, *transversal*. Although the longitudinal diameter, which might also be called *antero-posterior*, is not the largest, as I have just observed, I give notice that that is the diameter I shall mean whenever in future I shall make use of the terms *great* or *large* diameter: and when I say *little* diameter, I shall always mean the transverse.

one side to the other, and often from the summit to the base.

456. These changes, always favourable and often necessary to delivery, have limits which cannot be exceeded without danger to the child: but those limits are different in each individual, according to the degree of suppleness in the bones of the *cranium*, the breadth of the *sutures* and *fontanelles*; so that we cannot estimate them here. In some children the *cranium* may lengthen six or eight lines, or more, in the aforesaid direction, and lessen as much in its transverse diameter, not only with facility, but also without apparently injuring the functions of the brain; while, in others, the smallest alteration cannot be made in the form of that bony case without extreme difficulty, and much danger to the child.

457. The *sutures* in the *fœtus*, more numerous than in the adult, are not at all like what they become afterwards: the bones of the *cranium*, far from receiving one another mutually, by a kind of dove-tailing, as we see when they are completed, are only united throughout by a kind of membranous substance, and leave spaces between them, the largest of which are called *fontanelles*.

458. The

458. The most remarkable *sutures* in the *fœtus* are the *coronal*; the *sagittal*, which extends to the root of the nose; the *lambdoidal*; and the *temporal*, or *squamous*.

459. The most considerable *fontanelle* is at the union of the *coronal* with the *sagittal suture*: it is called the *bregma*, or anterior *fontanelle*; its figure is nearly that of a lozenge. It was long believed, and is still believed by some, to have a pulsation; but nothing of the kind exists in it before birth.

460. If we should find some motion in this *fontanelle*, in new-born children, even a regular pulsation, we ought not therefore to conclude that it existed before birth; because the modes of being in those two states are very different. The infant just born respire, cries with more or less force, and almost continually exerts the motion of sucking; the blood driven with more force towards the head, and the action of the *crotaphite* muscles on the bones of the *cranium* whose angles border the *fontanelle*, may easily produce an alternate tension, and a pulsatory movement, which certainly neither did nor can exist in the *fœtus* while *in utero*.

461. The place where the *sagittal* and *lambdoidal sutures* join, is also called a *fontanelle*;
though

though there is scarcely ever any membranous space in it, as in the former. This *fontanelle*, which in the course of this work will always be called the *posterior fontanelle*, differs also from the preceding, in being formed of only three bony angles, and in being only as it were the point of union of three branches of *sutures*: while the anterior is composed of four angles, and as many *sutures* terminate in it; which makes them easily distinguishable by the touch*.

462. We see, at each extremity of the *coronal* and *lambdoidal sutures*, other membranous spaces, which are also so many *fontanelles*. Those which are found at the bottom of the latter of these *sutures*, are very perceptible to the touch; but those of the *coronal suture* can scarcely be felt, being profoundly hidden in the temporal *fossæ*, and covered by the *crotaphite muscles*.

463. The articulation of the head with the *trunk*, its natural situation, and motions, are not

* We sometimes, though very rarely, meet with a fourth angle in the posterior *fontanelle*, because the *occiput* is then divided into two; and in that case there are likewise four branches of *sutures* which terminate in this *fontanelle*. Notwithstanding that, it differs so much from the former, that it is almost impossible to be deceived in it, even when we cannot touch them both, to compare them.

less necessary to be known. The first is a species of *ginglymus*, which permits but very small motions, either forward, backward, or on the sides: if the head executes greater, they depend on the combined motion of all the *cervical vertebrae*.

464. Although these motions are freer in the *fœtus* than in the adult, yet they nevertheless have limits, which it is very essential to be acquainted with, that we may not exceed them in our management of difficult labours; especially those pivot-like or rotatory motions, which depend almost entirely on the twisting of the neck. The extent of this latter is such, that the face cannot without inconveniences describe more than a quarter of a circle.

465. The natural situation of the head of the *fœtus*, or of a new-born child, is such, that the chin is much lower than the *occiput*; and the axis of the *trunk* passes a little before the posterior *fontanelle*, traversing the *cranium* obliquely from its base to its summit, and from before backward.

466. As the accoucheur must have a regard to the structure of the head, to its dimensions, its natural situation, its connection with the body, and to the movements it can execute; so
also

also he ought to have a perfect knowledge of the composition of the *trunk* and the extremities, as well as of the direction and limits of their motions. As it is dangerous, in some cases, to make the child's head describe a rotatory motion more extensive than its articulation with the neck, and that of the cervical *vertebræ* with each other, will bear; so in other circumstances it would not be less dangerous to go beyond the bounds which nature has fixed to the rotation of the body, the head being then supposed immoveable. Presuming that all those who apply themselves to the study of midwifery are sufficiently instructed in *anatomy* to perceive all these truths, I shall not enter into any detail on the subject.

467. By comparing the principles established thus far, as well with respect to the *pelvis* of the woman, as to the body of the child to be born, we discover the fundamental principles of the Art of Midwifery: we perceive the course of nature in the admirable work of our birth; and the rules we ought to follow, in many cases, to assist her, or perform that which she very often could not, without danger to both mother and child.

468. The accoucheur who has perfectly comprehended all these things, will not only know

that a child at full time cannot be expelled from its mother's womb, without presenting one of the extremities of its largest diameter to the orifice; but likewise how those parts must be placed, and what turns they must make in advancing, that delivery may be performed with facility.

469. That delivery may be thus performed, the head must present diagonally at the entrance of the *pelvis*, the *occiput* behind one of the *acetabula*, and the forehead before the *sacro-iliac symphysis* of the other side. It must descend so as to expose the posterior *fontanelle* more and more; and in such a manner that the *occiput* may turn under the arch of the *pubes*, and the forehead into the curve of the *sacrum*, &c. The shoulders must make the same turns in passing from the superior to the inferior *strait*; because their breadth is greater than the extent of the small diameter of those *straits*.

470. In those labours where the child presents the feet, the shoulders and head must likewise present in the same manner to the openings of the *pelvis*; that is to say, so that their largest diameters may always be placed in the same relation to those of that cavity. But as, in the first case, the head must engage in the *pelvis*
by

by its posterior extremity; in the latter, it must do it by the chin, &c.

471. This course, dictated by the relation of the dimensions of the *pelvis* to those of the child's body, is also that which nature follows in those labours left to her alone, as any one may assure himself by a careful observation.

S E C T I O N IV.

Of the Secundines, or After-birth, and particularly of the Placenta.

472. UNDER the name of *secundines* or *after-birth* is comprehended the *placenta*, the membranes, and the umbilical cord; and we might add the waters to them.

473. There would have been an impropriety in classing these substances under the generical name of *secundines*, if we had attended to the time of their formation and development, and not to the time of their expulsion from the *uterus*; since they are formed before the *fœtus*, or at least have acquired a degree of perfection at a time when the outlines of the *fœtus* are scarcely

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begun.

begun. We must however except the umbilical cord, which, as is well known, is nothing but a production of the *hypogastric* vessels of the *fœtus*. This denomination has then been given them, because the expulsion of all these parts does not take place till after that of the *fœtus*, and because it is the last burden the woman has to get rid of.

474. If the order in which the substances which constitute pregnancy are developed, is constantly such as I have stated in the preceding paragraph; if the *secundines* exist before the *fœtus* is obvious to our senses; if we often meet with them without a *fœtus*, and a *fœtus* never can exist without them; we cannot doubt that they are made for it, and that they have very important functions to fulfil respecting it.

475. According to the order of the first development of all these substances, it seems equally demonstrated that the *secundines* are nourished only by the juices transmitted to them by the vessels of the *uterus*; at least in the beginning of pregnancy, when they cannot possibly receive any thing from the *fœtus*. But these fluids must be very thin at first; for it is not till after a certain

tain time that the blood of the mother can find admission to them.

476. The *secundines*, in the first months of gestation, are not such as we find them at the end: after several weeks, they are nothing but a kind of membranous bladder, on which we can scarcely perceive a rising down; but which in a short time is so covered with it, that the membranes no longer appear without separating the tufts of that down.—See par. 425.

477. This down, which then covers them all over, is afterwards collected into a determined space, and forms that kind of spongy cake known by the name of the *placenta*; so that, at the time of delivery, this species of sponge covers but about a fourth part of the *chorion*.

478. The *placenta* is a spongy and vascular mass, thick in the middle, and thin at its edge: it is seven or eight inches in diameter; and twelve or fifteen lines thick in the center, at full time. These dimensions however vary a little, according to the constitution of the woman, the strength of the child, and the part of the *uterus* on which the *placenta* is, as it were, grafted.

479. The *placenta* is always formed of several lobes, united by a cellular membrane so fine and

delicate, that the least force will tear it. Merely folding up this mass will separate its lobes, and make its external surface appear very unequal, and deeply furrowed; whereas in its natural state we only discover very superficial convoluted furrows, covered by a thin layer of cellular membrane, and which have a kind of resemblance to the anfractuosities of the brain.

480. Almost all anatomists have supposed that certain vascular eminences of the *placenta* are received into the openings of the *uterine sinuses*, in order to take up the fluids necessary for the development of the *fœtus*. What I have seen most remarkable on the external surface of this spongy body, are cavities contiguous to the orifices of those *uterine sinuses*, by means of the cellular membrane which binds the *placenta* to the *uterus*. But those cavities do not appear clearly, except at the time of separating the *placenta* from the *uterus*; for their edges presently shrink, and they then appear only as a kind of rent.

481. By this disposition the uterine blood easily passes into the cells of the *placenta*, where the umbilical veins take up what is necessary for the development of the *fœtus*, while the arteries

of the same name return thither what is superfluous. Experiment has never yet been able to demonstrate that those vessels advance as far as the *sinuses* of the *uterus*, nor that those of the *uterus* go into the substance of the *placenta*; much less that any *anastomoses* exist between those two systems of vessels.

482. The internal surface of the *placenta* is always lined by the *chorion* and *amnion*: and it is, properly speaking, nothing but an expansion of the cellular tissue of the former of those membranes, whose layers are otherwise modified and arranged than in the rest of its extent; just as the spongy substance which renders the extremities of long bones more voluminous than their bodies, is only a development of all the fibres which form the compact substance. Whence it follows, that the *placenta* is so united to the *chorion*, that we cannot separate it from it, as we can the *amnion*, which quits it very easily.

483. On the internal face of the *placenta* we observe an admirable *plexus* of arteries and veins, whose center is sometimes in the middle of that surface, and sometimes at the edge, or any other part; without our being able absolutely to assign the cause of that variety. It is difficult to conceive what could make an accoucheur of the

greatest merit say*, that the union of all these vessels is made in the center of the *placenta*, whenever that center answers to the center of the *fundus uteri*; and at its inferior edge as often as it occupies a region in the neighbourhood of the orifice of that *viscus*. Experience has a thousand times proved the contrary of this assertion. We often meet with the center of that *plexus*, or the insertion of the umbilical cord, in the middle of the internal face of the *placenta*, though it be attached in the neighbourhood of the neck of the *uterus*; or near the edge of the mass, though it seem to occupy the middle of the superior part of that *viscus*. We may also affirm, that the cord is implanted indifferently in every part of the edge of the *placenta*; and as often in that point which is farthest from the orifice of the *uterus*, as in that which is nearest.

484. The vascular *plexus* in question serves as a base to the *umbilical cord*, and is formed only by the branches and ramifications of the arteries and of the vein which constitute it. The ramifications of the vein appear like so many slender roots rising from the substance of the

* *Levret*, Suite de ses Obs. sur la Cause des Accouch. Labor. quat. ed. p. 177 et suiv.

placenta, if we only regard the direction of the blood, which unite to form other branches more considerable, destined in the same manner to form but one *trunk*, which is the *umbilical* vein. The arteries are a continuation of the primitive *iliacs* of the *fœtus*; they divide and subdivide as soon as they arrive at the *placenta*, into the substance of which they enter, and there lose themselves by very slender extremities. All these vessels distributed in a radiated manner on the internal surface of the *placenta*, form *areolæ* and *anastomoses* very remarkable. Not only the branches of the arteries communicate with each other in many places, but also some of them with veiny branches; so that it is sufficient to inject one of the two *umbilical* arteries to fill the whole *plexus*.

485. We find no valves in the *umbilical* vein, as in other veins; but we find some in the arteries, if not always, at least generally.

486. The *placenta* often presents us with varieties, some of which relate to its figure, others to the insertion of the *umbilical* cord, and to the number of children which constitute the pregnancy.

487. Some of the lobes mentioned in par. 479, are sometimes separated from the principal mass,

mafs, but communicate with it by means of veffels and membranes; thus constituting, as it were, fo many little *placentas*. I have feen two of nearly an equal fize for one child; but they were fmaller than when there is but one. Another time I met with one as fmall as the palm of the hand, and another much larger; but yet bound together by membranes and veffels. I have met with one formed very much like a kidney, the cord being inferted in the middle of a notch, in the fame manner as the *ureters*, &c.

488. The *placenta* feems to take a new form according to the part of its furface in which the cord is implanted. When the cord is inferted in the edge, no matter on which fide, it is called a *battledore placenta* (*placenta en raquette*), becaufe it is formed fomewhat like one. If we could difcover this and the preceding varieties before we proceed to deliver the after-birth, we might often avoid fome of the difficulties we meet with in performing it, and efpecially when the cord is attached to the inferior edge of the *placenta*. —See par. 940.

489. When there are twins or triplets, we fometimes find as many *placentas* as there are children; at other times, and which is the moft frequent, they are united through a certain extent

tent of their edges, and seem to form but one mass; but, notwithstanding this connection, there is scarcely any communication between their vessels, which may have great advantages.

490. Twins have however almost always something common to both, in those cases where there is a *placenta* for each; for they are then enveloped in the same *chorion*, which unites the two masses of *placenta* so strictly, that we cannot extract one without the other*.

491. The *placenta* may attach itself indifferently on any part of the internal surface of the *uterus*. It generally occupies the middle regions; rarely the middle of the *fundus*, so as for its center to answer to the center of that; and more rarely still the inferior part, or the orifice. It has appeared to me constantly smaller in women where it was attached to this latter region of the *uterus*, without being able to attribute that difference to the blood lost from it before delivery; and, as M. *Levret* observes, it is then thicker in its middle, which rises in form of a large nipple, when it is placed on an horizontal plane†.

* See the article on twins, at the end of this work.

† M. *Levret*, Suite de ses Observations sur la Cause des Accouchemens Laborieux, edit. quatrième, p. 68.

492. All practitioners are agreed concerning the first truths contained in the preceding paragraph; but the greater part have made them the base of a multitude of errors, more or less injurious to the progress of the art.

493. It is not in fact the adhesion of the *placenta* to this or that region of the *uterus*, which causes the obliquity of that *viscus*, or bad positions of the child; neither does it make any alteration in the figure of the *uterus*, or the external form of the belly, as some have pretended. I have combated a part of these errors in par. 277, and following; I shall endeavour to destroy the rest in the sequel of this work.

494. No sign can inform us before delivery what place the *placenta* occupies, unless it be on the neck of the *uterus*, or at least in its vicinity, and that the finger can discover it; but it is easy to judge of it after the exit of the child, by following the cord into the orifice of the *uterus*, and observing whether it descends from the posterior or anterior part, or from one of the sides. It is not till the *placenta* is delivered that we can estimate how far it was removed from the orifice, by attending to the distance from the opening of the membranes to the center of the internal surface of that mass. As that opening

opening constantly answers to the orifice of the *uterus*, and as this latter is diametrically opposite to the *fundus*, whenever it shall be equidistant from all points of the circumference of the *placenta*, we may affirm that its center answered to the center of the *fundus uteri*; the nearer it approaches to the edge of the *placenta*, the farther that was removed from the *fundus*, &c.

495. Whatever may be the strength of the adhesion of the *placenta* to the *uterus*, it is only attached to it by a very fine cellular membrane, which it is commonly very easy to destroy. We see nothing like that mutual reception which some talk of; and the firmer or weaker adhesion does not depend on the eminences of the one being more strongly or feebly engaged in the *sinuses* of the other.

SECTION V.

Of the Membranes.

496. OF the two membranes which form the oval bag which contains the child (see par. 426), the first, or the *chorion*, is cellular externally, and

especially near the *placenta*, where we even sometimes find a little fat, which renders it thicker, and in some measure opaque.

497. Although the *chorion*, when floating in water, appears rough externally, with a kind of very fine down, yet we are not to suppose that each filament is a lymphatic vessel: it rather appears that this down is nothing but a cellular tissue, by which that membrane is attached to the *uterus*; but we cannot however deny that it has some vessels of the kind in question.

498. The *chorion* does not form a sheath for the *placenta*; it passes under that mass, which may be looked upon, as I have observed in par. 482, as an expansion of the cellular tissue of that membrane: the fibres which compose its layers, differently distributed in the *placenta*, constitute a kind of sponge, which the *umbilical* vessels make appear more organized than the rest.

499. On the external face of the *placenta* we find nothing but a membranous layer, extremely fine, which covers the furrows or anfractuosities mentioned in par. 479; but this layer does not line the whole extent of that surface, as the *chorion* lines the internal face. Though the different layers of which this membrane is composed, are
suffi-

sufficiently separated in the vicinity of the *placenta*, and in several other parts of its internal surface, to admit an adipose juice, even in large quantity, yet in the parts farthest from it they are so close that they seem to form but one: there this membrane is of a closer texture, and more equal externally.

500. The *amnion* is a very thin membrane, and transparent throughout. Its internal face, very smooth, immediately touches the waters which surround the child. It is united to the *chorion* through the whole extent of its external face, by means of a cellular tissue extremely fine, but so that its adhesion is less strict at the *placenta* than elsewhere; which causes those membranes to separate more easily in that part than in any other.

501. These two membranes are continued over the *umbilical* cord, and give it a covering through its whole length. The *amnion* always forms, at the beginning of the cord, a fold like a little scythe, whose two layers easily separate with the smallest efforts for extracting the *placenta*; so that a cavity, more or less spacious, is then formed between the *chorion* and *amnion*; which may have made some accoucheurs, not sufficiently attentive, imagine that there existed
in

in the human *fœtus*, as in those of some brutes, a third membrane called *allantois*.—See par. 506.

502. Some anatomists have thought that the *amnion* terminates on the cord at two fingers breadth from the *placenta*, as the *epidermis* of the *fœtus* does near the *umbilicus*; but, if we cannot trace it farther, it is because it is intimately united and confounded with the *chorion*.

503. It seems not impossible that these membranes should disunite and separate to a certain extent during pregnancy, as most accoucheurs think, to form a kind of bag, which then fills with a fluid which they call *false waters*; but that happens so rarely, that I have not yet met with it.

504. The membranes are sometimes of a very dense and close texture; at other times very fine and delicate, or very loose. In the first case, they may retard delivery, by making too much resistance to the efforts of the *uterus*. In the second, by tearing too soon, they may render it more laborious and painful; not, as the vulgar think, because the labour is dry, but for other reasons which will be explained in the sequel*.

505. The extreme tenuity of the membranes

* See par. 627, and following.

may also occasion a premature delivery in women where the orifice of the *uterus* opens early, and especially in those who have already had several children ; because in that case the membranes, being too weak to support the weight of the column of fluid which presses on that part, burst, and permit it to flow off, sometimes long before the proper period. We might cite a crowd of examples in proof of this assertion.

506. We find in brute animals, who have the *urachus* open through its whole extent, a third membrane placed between those we have been treating of : it is called *allantois*. In some it equals only a very small portion of the *amnion*, in others nearly the half, and in many the whole of that membrane. Its use is to serve as a reservoir for the urine of those animals, till the time of their birth.

507. We find nothing of the kind in the human *fœtus*, though some anatomists assure us they have found and prepared this membrane, some exceptions do not destroy the general rule. I have sought for it in a great number of after-births, and at all periods of pregnancy, without having found the smallest vestige of it. What purpose could such a bag serve in the human *fœtus*, if at the time of birth, and even a long

VOL. I. U time

time before, the *urachus* is entirely ligamentous?
—See par. 513.

508. Some anatomists make mention of another membrane also, which might be regarded as another produce of conception, if it existed really, and separately from the two former, in every period of pregnancy: it is called *decidua*. We may see its situation and connections, as well with the *uterus* as with the other membranes, in the tables of Dr. *William Hunter*, the first who has mentioned it. This membrane *decidua* does not seem to exist manifestly but in the first months of pregnancy, and is more considerable towards the lower part of the *uterus* than in any other part. It identifies itself so with the *chorion* in the latter periods, that we no longer find it separate from that. I cannot admit it at any period as a particular membrane, but only as a layer of the *chorion*.

SECTION VI.

Of the Umbilical Cord.

509. THE *umbilical cord* is known to all, but its structure is not equally so. It is formed of

two arteries, and one vein, whose diameter is larger than those of the arteries. This structure is not however always the same, since we have seen many cords with only one artery.

510. These vessels, whose origin is already known, according to par. 484, wind round each other, like the twigs which form the handle of a basket: sometimes the arteries creep round the vein, like ivy round a tree; and sometimes the vein does the same round the arteries. This vein often folds itself into a kind of loops of different lengths, or forms itself into a species of knots, subject to become varicous. These vessels are closely bound by the cellular tissue of the *chorion*, and send off no branch in the whole length of the cord.

511. They divide and subdivide on the internal face of the *placenta*, to form the *plexus* mentioned in par. 483; and they separate from each other at the posterior part of the *umbilical ring*. The vein ascends along the great *falx* of the *peritonæum*, towards the *scissure* of the *liver*, to enter the *sinus* of the *vena porta*; and the arteries descend towards the lateral parts of the *fundus* of the bladder, from whence they make a turn towards the *iliac* arteries, of which they are almost always a continuation.

512. The *umbilical* vein, as it approaches the *sinus* of the *vena porta*, sometimes divides into two branches, one of which, known by the name of the *veinous canal*, is inserted into the *vena cava inferior*. When this bifurcation does not take place, the *veinous canal* rises from the *sinus* of the *vena porta*; and that is what we find most frequently.

513. Another kind of cord rises from the top of the bladder towards the *umbilicus* of the *fœtus*, where it terminates; that is the *urachus*, already mentioned in par. 506. It is almost always ligamentous throughout, and has no cavity, at whatever period we examine it.

514. We discover no nerves in the cord, any more than in the *placenta* and membranes; therefore those parts are insensible.

515. The *chorion* and *amnion* furnish a common sheath to the three umbilical vessels; and the skin of the *fœtus* advances about a finger's breadth on the cord, but growing thinner and thinner. It is always at the place where the skin terminates that the cord falls off from the *umbilicus*, at whatever distance from it, it be tied and cut.

516. The length of the cord varies very much, but it is commonly from twenty to twenty-two

inches: the two extremes which I have seen, have been from six to forty-eight inches. There has since been seen another cord of fifty-seven inches, forming seven turns round the child's neck*.

517. When the cord is much longer than usual, it may not only turn itself round the child's neck or other parts, but also form knots upon itself, as I have seen many times. These knots cannot however cause the child's death, as many accoucheurs have advanced, nor even influence its development so far as to make it appear smaller at the time of birth.

518. Some of these knots are formed during pregnancy, and even very early; but there are cases where they are not formed till the instant of the expulsion of the child: it is easy to explain the mechanism of their formation in both cases. At whatever time they may be formed, they can never draw themselves so tight before delivery, as to oppose the course of the blood in the *umbilical* vessels: the reason of it is so evident, that it would be useless to state it here.

519. If this truth is incontestable, we must at-

* M. L'Heritier, master in surgery, was a witness of the fact at the Hotel-Dieu of Paris.

tribute to some other cause than a knot on the cord, the death of a child born with the cord knotted; as well as the delicacy and weakness of others born in the same manner. When the cord ties itself in a true knot, says M. *Levret*, the child dies, or at least is born much emaciated (voyez L'Art des Accouchemens, § 305). This opinion, which other accoucheurs held before M. *Levret*, and which some have adopted since, could not be the fruit of a series of observations. Eight or ten examples of robust children whom I have seen born with knots on the cord, appear to me fully sufficient to invalidate such an opinion.

520. Not only a single knot may be formed on the cord, without influencing the development of the child; but several also may be formed on it with as little inconvenience. I have several times found two, and the child was as large as usual.

521. A single knot, or even several at a certain distance one from the other, present nothing but what we can easily account for; but we cannot so clearly conceive how the cord can be tied in a triple knot, and interwoven like a mat, as I have seen it. The fact appeared to me so extraordinary, that I have caused it to be
engraved,

engraved, to give an idea of it to those who have not an opportunity of seeing it *: I preserve it in spirit of wine. The child who was born with the cord tied in this manner, was at least of seven pounds weight, and in very good health †. The triple knot was about a foot from the *umbilicus*; and the cord, which was thirty-six inches long, formed two circulars round the child's neck. The knot was drawn as tight as any knot in those circumstances can be.

523. The shortness of the cord, whether natural, or arising from its being twisted round the neck or other parts of the child, can produce no obstacle to delivery before the head is without, though the contrary has been believed. After the head is delivered, the circulars which surround the neck may be drawn so tight as to compress the jugular vessels, and cause a swelling and lividity of the face. Some inconveniences may also result from it to the woman, either before or during labour: as a dragging or separation of the *placenta*, and even a rupture of the cord. But, to produce these, the *uterus* must contain a great deal of water, and the child must execute very considerable movements.

* See the seventh plate, fig. 2, 3, 4.

† This child was born May 14, 1786.

524. I know no example, whose reality cannot be doubted, of a rupture of the cord either totally or in part before the full period of gestation, though M. *Levret* and others quote several; but we are certain it may take place at that time, and that a very considerable extravasation of blood may result from it, into the cavity of the membranes.—See par. 1084.

525. The thickness of the cord varies very much: sometimes it is very slender, and sometimes very thick, which in the latter case arises from the repletion of the cellular membrane. That membrane may putrefy without any injury to the well being of the child, provided the *umbilical* vessels be exempt from corruption. The example of children born with the cord putrefied is therefore not at all surprising.

Explanation of the Seventh Plate.

Fig. I. A simple knot on the *umbilical* cord.

Fig. II. The complicated knot mentioned in
par. 521.

Fig. III. The same knot, in another view.

Fig. IV. The same knot loosened.

SECTION VII.

Of the Waters of the Amnion.

526. THE waters contained in the cavity of the *amnion* are usually clear, and without any disagreeable odour; sometimes they are whitish, milky, and full of flakes of a matter which appears like cheese. In some women they are muddy, thick like broth; sometimes they are greenish, brownish, or greyish, and of an odour singularly fetid*.

527. In the natural state, these waters have all the characters of the liquors of the *pericardium*, the *pleura*, and the *peritonæum*; being, like this latter, lymphatic, and a little greasy to the touch. They exude from the membranes by a mechanism exactly similar to that by which the liquor of the *pericardium* is supplied.

528. It is without doubt much less reasonable to believe that these waters come from the transpiration of the *fœtus*, and that they contain a

* They were found greyish, and of a consistence like mud, in a woman who was delivered in my amphitheatre; and they exhaled an odour so strong and disagreeable, that no one could remain near the bed.

part of its urine, than to suppose glands in the *placenta* for their secretion, or *anastomoses* between the lymphatic vessels of the *uterus* and those of the *chorion*; although none of these sources furnish them.

529. The strongest proof that the waters of the *amnion* do not come from the *fœtus*, is, that we find them before that is obvious to our senses, and that they are very abundant at a time when the *fœtus* is very little. We may add, that the membranous bag which covers the greater part of moles, is always full of them.

530. The saffron colour which has been remarked in them, in a woman who had taken a great deal of that drug*; and the property which they have of whitening copper, in women who have used mercurial frictions during pregnancy†; demonstrate that they are furnished by the vessels of the *uterus*, and that they come from the mother.

531. Most accoucheurs distinguish two kinds of waters; one contained in the *amnion*, the other collected between that membrane and the *chorion*. They call these latter *false waters*; these are the

* *De Haller.*

† *Levret, L'Art des Accouch. § 320.*

waters, say they, which many women discharge some time before labour: but those accoucheurs seem to me to be in an error. Those waters do not come from particular cysts, which have been supposed to depend on a separation of the membranes, but from the cavity of the *amnion* itself: they drain off by transfudation through the pores of that membrane and of the *chorion*.

532. Although the source of the waters of the *amnion* is not dried up at any period of pregnancy, they are less abundant, relatively to the volume of the *fœtus*, in the latter months, than at the beginning: but their absolute quantity is greater at the approach of labour than at any other time, unless in women who lose them in the manner mentioned above.

533. Nothing is more various than the absolute quantity of this fluid: some women scarcely discharge a pint, or even half a pint, in time of labour, while others discharge many quarts.

534. These waters do much less injury both to mother and child by their excess than by their defect; for the most painful and troublesome pregnancies are those where this fluid is deficient: except in those cases where they are in so great quantity, that there seems to be a
dropsy

dropfy of the *uterus* rather than a common pregnancy.

535. They are one of the instruments which nature uſes to effect the dilatation of the *uterus* in pregnancy, and the opening of its orifice in labour. Theſe waters, on account of their lymphatic quality, have appeared fit for the nutrition of the *fœtus* (ſee par. 537 and following); beſides, they facilitate its motions, render them leſs troubleſome and painful to the mother, and likewiſe diminifh the too violent impreſſion of external bodies on the child. Laſtly, a modern author regards them as one of the agents of the firſt inſpiration, and thinks they ſerve to cool the blood of the *fœtus*, which is difficult enough to comprehend*.

S E C T I O N VIII.

Of the Manner in which the Child is nourished during Pregnancy.

536. THOUGH all phyſiologiſts agree that the child draws its nourifhment from the mother,

* M. David, *Traité ſur la Nutrition.*

they

they are not agreed concerning the nature of the fluids it receives from her, nor on the manner in which she transmits them to it. Some think they are only white fluids, and others that it is blood.

537. The inclination of a new-born child to suck, and the power it has of doing it at the instant of birth, made some among the ancients believe that it sucked certain *tubercles* of the *uterus*; but the analogy which has been supposed to be found between the liquor contained in the stomachs of children, and the waters of the *amnion*, has since caused it to be believed that they are nourished by them.

538. All those who are of opinion that the child is nourished by the waters of the *amnion*, are not agreed on the manner in which it receives that nourishment; some assure us that it is by deglutition, and others by intromission. It is wrong, says a celebrated author, whose name will be transmitted to the latest posterity*, to suppose that the child can be nourished by the pores, and to deny that it swallows the *liquor amnii*; while another, whose authority is of equal weight, assures us that we may doubt the reality of this latter function, and that we cannot refuse

* *De Haller.*

to admit the intromission*. Which shall we believe?

539. By examining scrupulously the reasons adduced in favour of each of these opinions, we see that neither of them can be admitted; and especially that which pretends that the *fœtus* is nourished at the mouth, by swallowing the waters of the *amnion*. No experiment can demonstrate it; and, admitting that the liquor contained in the stomach be perfectly similar to the *liquor amnii*, we could not thence infer that it serves to nourish the child, and that it uses that liquor as we use our aliments. We should not be better founded in supporting this opinion, if we should really see the child throw up the liquor of the *amnion*, by vomiting as soon as it is born, as it sometimes does. I have seen some throw it up who were gorged with it, and sometimes even mixed with blood or *meconium*; some as soon as born, and others several hours afterwards. Many times also I have been obliged to empty the child's mouth, which was full of glairy matter mixed with blood, of pure blood, or of *meconium*; and wash it with a folded rag dipped in warm water.

* M. *Levret*, *Elemens sur l'Art d'Accoucher*, § 320.

540. Had the child swallowed, before or after its birth, the waters of the *amnion* which I have seen it throw up, sometimes pure, and sometimes mixed with blood or *meconium*? Had it swallowed them by way of nourishment, or had they been accidentally forced into its mouth? It is easy to answer all these questions, when we are acquainted with the friction the child's face must undergo as the head disengages; the direction which the expulsive forces of the *uterus* impress on the fluids which that *viscus* still contains at the last period of labour; and the great aptitude of the child to suck and swallow as soon as it is born. It is by accident that those fluids, often mixed, are forced into the mouth; it is always in the last period of labour that they penetrate it; and it is in consequence of that aptitude just mentioned that they pass into the stomach immediately after birth: and the child commonly throws them up in a short time.

541. The objections which have been made to the opinion that the child is nourished by introsusception, or by absorption, are better founded than those which have been raised against deglutition. It is certain that it may absorb a part of the fluid in which it swims, and that
that

that fluid has some nutritive qualities: but is that the principal way of its nutrition, and can it take enough up that way to suffice for its development in any period of gestation? The negative of this is too evident to need a demonstration here.

542. It is much more certain that the *fœtus* receives its nourishment by the umbilical cord than any other way; and the proof of it is so clear, that no one would dare to contest it: but the same variety of opinions exists also concerning the nature of the fluids transmitted to it by that canal.

543. The difficulty of passing the thinnest injections from the vessels of the *uterus* into those of the *placenta*, and *vice versa*; the milky humour which we have seen draining from the *cotyledons* which supply the place of a *placenta* in ruminating animals, as well as the extreme delicacy of the vessels of the *embryo* in the first periods—have made the greater part of physiologists believe that the child receives none but white juices from its mother.

544. According to this opinion, it is the *fœtus* which forms its own blood, as we see in a chicken. Admitting that the blood which circulates in the vessels of the *fœtus*, among which

we reckon those of the *placenta*, is formed in that manner; whence comes that abundance of blood which fills the vessels of the *placenta* in the first periods of pregnancy, when the *fœtus* is nothing but a tender and delicate jelly, scarcely apparent to the sight; as well as that with which we find that mass so filled in those cases where we give it the name of *mole*? It is without doubt such observations as these which have made some believe that the *placenta* is the organ of sanguification for the *fœtus*; and others, that the mother transmits the blood to it ready prepared.

545. We cannot reasonably deny the passage of the blood from the *sinuses* of the *uterus* into the cells of the *placenta*. That which fills them before the *embryo* is, as it were, sketched, and in those cases where no *embryo* exists, as well as the floodings which succeed a separation of that mass from the *uterus* in every period of gestation, demonstrate it clearly. But we may be allowed to doubt its arrival at the *fœtus* in the first periods of its formation; because of the great disproportion which must exist at that time between the roots of the umbilical vein, and the volume of the red globules.

546. It is in the *placenta* itself that these veiny
roots

roots take up the fluids necessary for the *fœtus*, and not in the *sinuses* of the *uterus*. If at first they absorb nothing but white and thin juices, they afterwards take up the blood itself, mixed with those same nutritious fluids; in the same manner as the *pudica* and *splenica* take up the blood extravasated in the cavernous texture of the *penis* and the *spleen* *.

547. It is very true that the blood of the mother does not pass immediately from the arteries of the *uterus* into the umbilical veins; and that that of the *fœtus*, brought back again by the arteries which accompany those veins, does not go directly into the veins of the *uterus*. There is no *anastomosis* between those two kinds of vessels;

* The circulation of the blood from the mother to the *fœtus*, and from the *fœtus* to the mother, appears to me so out of doubt, notwithstanding the numerous experiments and observations according to which some physiologists still reject it, that I cannot avoid admitting it. It seems to me demonstrated by some of those same facts, and by a much greater number of others. It is so evident, that the partisans of the contrary opinion are obliged to admit it tacitly, as we may convince ourselves by reading their works. I am sorry that the limits of mine do not permit me to discuss fully this point of physiology, which has constantly made the subject of three lectures in my course of midwifery—so interesting it has appeared to me.

but there are cavities into which the blood is poured from both.

548. These reservoirs are the uterine *sinuses*, contiguous to the cellular cavities of the *placenta*, which I have mentioned above. The arteries of the *uterus* pour their blood into them, as the umbilical arteries do on the side of the *placenta*, where they are mingled, and taken up again by the veins of the same name; the one to return it into the general mass of humours of the woman, the other to conduct it to the *fœtus*.

S E C T I O N IX.

Of the Circulation of the Blood in the Fœtus.

549. THE blood taken up from the cells of the *placenta* by the roots of the umbilical vein, is poured into the *sinus* of the *vena porta*, where it is mixed with what that vein has received from other parts; and from thence it passes into the *vena cava inferior*, as well by the venous canal, as by the hepatic veins; to be transmitted into the left *auricle* of the heart, along with the blood which returns from the inferior extremities, and from

from some parts of the breast and *abdomen*: while the right *auricle* receives from the *vena cava superior* what returns from the head and the superior extremities*.

550. The left *auricle* pressing the blood which it has received from the *vena cava inferior*, and by means of the *foramen ovale* and the pulmonary veins, forces it into the left *ventricle*; as the action of the right *auricle* forces into the right *ventricle* the blood it has received from the *vena cava superior*: and those two *ventricles* distribute it anew to all parts of the body, and even to the *placenta*.

551. The left *ventricle* distributes it to all parts without exception, even to the lungs; since there is no part which does not receive its arteries from the *aorta* and its principal branches: but the right *ventricle* in the adult distributes it only to the lungs.

* I formerly thought, with a great many authors, that the blood of the two *venæ cavæ* was poured into the right *auricle*, from whence it passed partly into the right *ventricle*, and partly into the left *auricle*, &c. (see the first edition of this work, § 509, and following); but from new researches, to which I have been led by reading the memoir of M. *Sabatier* on the organs of the circulation of the blood in the *fœtus*, I here adopt a different opinion.—See *Anatomic de M. Sabatier*, nouv. edit. tome iii.

552. In the *fœtus*, the blood propelled by the contraction of the right *ventricle*, is immediately divided into three columns; of those columns the two smallest go to the lungs, while the principal one is transmitted into the *aorta inferior* by the arterial canal, and communicates to the blood which has been propelled thither by the action of the left *ventricle*, all the force which it has itself received from the contraction of the right *ventricle*: so that that fluid circulates through the *aorta*, and all its divisions, by the united force of the two *ventricles*.

553. The course of the blood carried by the *aorta inferior* of the *fœtus*, extends at least as far as the cavernous tissue of the *placenta*; since a part of that fluid is brought thither by the umbilical arteries. These, after transmitting a part of it into the veins of the same name, by means of the immediate communications which exist between them, pour the rest into the cells of the *placenta*, and the cavities contiguous to the uterine *sinuses*; there it is mixed with the blood of the mother, and repairs the losses it has suffered by circulating through the *fœtus*; it undergoes a new elaboration; then returns to the child, loaded afresh with nutritious particles.

554. The circulation of the blood from the

uterus to the *placenta*, from that to the *fœtus*, and *vice versa*, is performed thus till the time of labour; but it then undergoes surprising changes, some of which depend on the contraction and closing of the *uterus*, and the others on the respiration which is established in the child as soon as it is delivered.

S E C T I O N X.

Of the Changes which Labour produces in the Circulation of the Blood reciprocally from the Mother to the Child; and of those which depend on Respiration, as soon as the Child is born.

555. THE compression which the arteries of the *uterus* undergo, and the change that takes place in their direction, while that *viscus* endeavours to expel the child and closes itself, cause the blood to flow in smaller quantity, and by a slower motion, into the *sinuses* of the *uterus*, which transmit less into the cells of the *placenta*, which are also lessened by the pressure which that mass sustains against the body of the child.

556. The diminution of uterine hæmorrhages

during each pain, and especially after the evacuation of the waters; their cessation after delivery, when the *uterus* hardens and contracts by its tonic action—so fully confirm this important truth, that there is no need to adduce any farther proofs.

557. The retardment which the motion of the blood undergoes in the uterine arteries during labour, is not only in proportion to the force and duration of each contraction of the *uterus*, but also in proportion to the reduction in the size of that *viscus*: therefore that retardment is less sensible in the first period of labour than in the second, and much less still in that than in the third, and after the delivery of the after-birth. It is on these truths that is founded the precept of exciting the labour pains in a violent flooding; of opening the membranes, to give the *uterus* an opportunity of lessening its bulk; and of immediate delivery, if the flooding continue notwithstanding those first succours. To put this precept in practice, is avowing those truths, the discussion of which, though it would not be superfluous, would lead me too far.—See par. 224, and following.

558. It is not only in the vascular system of the *uterus* that the course of the blood is retarded

ed or suspended during the efforts of labour; it is so likewise in that of the *placenta*, and even of the *fœtus*. The compression of the *placenta* on the child's body, and the shrinking of its cells, always proportioned to the violence of the contractions of the *uterus*, do not permit it to receive so much blood as before, whether it come from the mother or the child. That of the mother, which passes with difficulty into the *sinuses* of the *uterus* when the labour is strong, and the waters are evacuated, is taken up again by the corresponding veins; and that of the child, which used to be poured into the cells of the *placenta*, passes from the arteries into the umbilical veins, by means of their communications, and for the first time returns to the child in the same state as it went from it, that is to say, without being mixed anew with the blood of the *uterus*.

559. If the action of the *uterus* is strong in this latter period, and the child meets with any considerable obstacle to its exit, its effects are no longer limited to the effacing the cells of the *placenta*, and the other circumstances just mentioned. The compression which that mass suffers from it, soon extends itself to the vascular *plexus* which covers its internal face, and even to the umbilical

umbilical cord, which checks the circulation in it, and at length stops it; as happens when the cord, carried out by the waters, is compressed by the child's head against the margin of the *pelvis*; whether it form a loop without, or only present at the orifice of the *uterus*.

560. It is to this compression and obliteration of the cells in the whole mass of the *placenta*; to that which the whole system of umbilical vessels undergoes, not excepting the cord—that we must attribute the congestions and extravasations which we observe in a child, when a long series of efforts has been required to expel it, after the evacuation of the waters. By attending to the nature of those efforts, we may conceive why some children are born with the face tumefied and livid; with extravasations of blood both within and without the *cranium*; in a state of apoplexy, nearly dead, and very often actually so.

561. In the former, we always find the cord very full, and without pulsation; and if we cut it at several inches from the *umbilicus*, it discharges but a few drops of blood, and generally we are obliged to press them out. In those who have died in that state of apoplexy, we observe the same thing; and moreover blood extravasated in the *cranium*, as well on the surface
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of the brain as in its *ventricles*, and on the *dura mater*, detached in various parts. The bones of the *cranium* are injected with it, so as to appear blackish; and we often find a layer of that fluid in immediate contact with some parts of their external surface.

562. It would be in vain to flatter ourselves that we should succour the former of these children, and recal them to life, if we suffer the cord to remain whole. We can expect their salvation from no other means but the section of the cord, and the depletion we may procure by that means. The ligature, before this precaution, seals their doom, and precipitates them into the grave; and the danger seems to be the same, if we preserve the cord with a view of keeping the child warm, close to its mother, and of reviving it by her blood. There is no good to be expected from this dangerous precaution, since the communication of blood from the *uterus* to the *placenta* is interrupted, and the circulation seems extinguished in the child. By keeping it thus close to the mother, we deprive it of succours which cannot be effectually administered till it be separated from her.

563. If the arteries of the cord, cut at some distance from the *umbilicus*, shed so little blood
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in the cases stated in par. 561, the hæmorrhage is no more to be feared on the side of the mother. The umbilical vein, when divided, pours out at most but one or two spoonsful of blood; and even if the *placenta* should be entirely detached from the *uterus*, there would not escape much more from its orifice.

564. But we see the contrary after very sudden deliveries, in which the child is, as I may say, washed out by the current of the waters. A flooding is never more to be dreaded than in those cases: it is often so abundant, when the *placenta* is detached immediately after the expulsion of the child, that it scarcely gives the woman time to apprise us of it. When the *placenta* preserves all its connections with the *uterus*, the pulsations in the cord are sensible a longer time than in the preceding case. If we cut the cord, the child's blood flows rapidly from the arteries, and continues to do so till a free respiration takes place; while that of the mother flows through the umbilical vein, which descends from the *placenta*, as long as the *uterus* continues in a state of inactivity*.—See par. 232.

565. If,

* In a circumstance similar to that just stated, we did not make the ligature on the cord till we had received two porringers

565. If, in the natural order, there is little blood lost from the two extremities of the cord cut near the *umbilicus* ; if there is a very trifling depletion on both sides, so trifling that we cannot estimate it at more than one or two spoonsful—it is because the child is scarcely out of its mother's womb before it breathes freely ; and because the *uterus* is almost as quickly reduced to a very small volume.

566. The child sometimes respire even before it is entirely out of its mother's womb. I have seen some cry forcibly as soon as the head has been delivered, and when the shoulders scarcely appeared at the *vulva*. All children are not born with the same necessity of breathing ; some breathe a little sooner, and others a little later : but the cause which determines the first inspiration is the same in all ; and is not different from that which forces an adult to respire, when he has voluntarily suspended that function a few seconds.

567. The almost instantaneous cessation of the course of the blood in the umbilical arteries,

ringers of blood from the umbilical vein ; and we afterwards extracted a *placenta* whose vessels were as full as if they had been injected. This case is not the only one of the kind which I could quote.

as soon as the child is born, is without doubt one of those surprising phenomena of the animal œconomy, of which it is very difficult to give a satisfactory explication. Experience teaches us that it depends on respiration, since the blood flows freely in those arteries till that function is well established; then ceases; and recovers its course again if that new function should happen to be suspended a few minutes after birth, or only become a little laborious.

568. In these latter cases, if the arteries of the cord cut a few inches from the *umbilicus* be let loose, the blood flies out with rapidity; if they be tied, they fill above the ligature, and beat with sufficient force to move the end of the cord laid on the belly. If the obstacle which opposes respiration continue, the child soon becomes a victim to it: if the arteries be not tied, it suffers a dangerous or mortal hæmorrhage; and if they be tied tight enough to resist the course of the blood, it falls into a state of apoplexy or suffocation.

569. We know, in fact, that some children have died of an hæmorrhage at the cord several hours after their birth, even later; and that they have been found covered with a cake of blood under their clothes. I have myself succoured

two in a contrary state a few minutes after their birth. In one, too tight a roller had caused a livid swelling of the face, and had thrown it into a state of apoplexy; while a violent fit of crying had caused the same symptoms in the other*. I had no other way to snatch them both from immediate death, but making them lose some blood by the cord, which I untied instantly.

570. According to these and the like observations, should we not be founded in believing that the *placenta* supplies the place of lungs to the *fœtus*; since the blood cannot pass freely in the one, but its motion slackens, and even ceases entirely, in the other? We must not however imagine that the principal use of the *placenta* is to

* This latter, born about a quarter of an hour before, had at first breathed freely, and was not yet dressed. I shall not endeavour to determine what was the cause of the piercing cries he uttered, and which threw him three times into that same state. I shall only remark that we attentively observed, his father and I*, the progress of the suffocation, the swelling and lividity of the face, the swelling and pulsations of the cord, agitated on the belly by the efforts of the blood against the ligature; that we saw the blood spring forcibly from the two arteries every time the ligature was taken off; and the swelling and lividity of the face disappear in proportion to the discharge, though the same cries continued.

* The father of this child had some physiological knowledge.

serve as a *diverticulum* to the blood of the *fœtus*, till respiration is performed easily : it has other functions to fulfil relatively to the child.—See par. 544, and following.

571. There is none of the phenomena we have mentioned, as well concerning the circulation of the blood in the *fœtus*, as of the passage of that fluid from the *uterus* to the *placenta*, and from the *placenta* to the *uterus*, which may not furnish a source of reflections as curious as useful in practice.

P A R T II.

Of Natural Labour, and its subsequent Symptoms.

C H A P. I.

Division of Labour, of its Causes, its Signs, &c.

572. **T**HE general division of pregnancy into true and false, as well as custom, requires that we should distinguish labour, properly so called, from the expulsion of a mole, or any other body which might be the produce of conception.

573. Although the term *fausse-couche* is only proper to signify the exit of these latter substances, it is nevertheless used to express that of a child before there is a possibility of its living, instead of the word *abortion*, which is much more applicable.

574. When we consider the great disproportion we meet with between different *fetuses* at the same period of pregnancy, we cannot but

agree that some may be born, with a probability of living, sooner, and others later, according to the strength and constitution of each; but in general that probability is greater, as their birth approaches nearer to the time of their perfect maturity; and we do not look upon them as *viable* till the period of seven months complete.

575. The causes which determine the birth of a child before the time fixed by nature, may also influence the probability of its living. One of seven months, for example, which comes naturally, is more likely to live than one of eight, whose birth is owing to a violent or accidental cause.

576. The most usual epoch of labour is the end of the ninth month of gestation; but it is not invariable. The child may be born sooner, or a little later. Some women are delivered naturally at seven or eight months; and others have carried their children beyond the ninth, without any reason to suspect an error in their calculation, or that they had violated their conjugal faith.

577. The exit of the child has received different denominations, according to the period of pregnancy in which it happens, or the mode of its operation. It is called a miscarriage, before
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the seventh month ; delivery before the time, from that epoch to eight months and an half ; and delivery at full time, when it happens in the latter part of the ninth month.

578. In respect to the mode of their operation, labours are called natural, preternatural, or laborious, &c. These scholastic distinctions being arbitrary, I shall divide them into three principal orders :—1. Those which are performed naturally, or without assistance. 2. Those which require the help of art, but which may be performed by the hand alone. 3. Those which cannot be terminated but by the help of instruments, or in which it is useful to employ them.

579. If in these latter cases the action of the organs of the woman is not sufficient to perform the expulsion of the *fœtus*, at least it begins the labour : on which account all labours have some causes common, and some particular ; which may be again distinguished into determining, and efficient.

580. The common causes, of which we shall presently treat, are sufficient to effect deliveries of the first order. As to the particular causes, being different not only in each order, but in each species of labour, I shall not mention them till I come to treat of those labours to which they relate.

ARTICLE I.

SECTION I.

Of the common Determining Causes of Labour.

581. THE common determining causes of labour are, every thing capable of exciting the contraction of the *uterus*, in order to disencumber itself of its burden. Some are accidental, and produce abortion, or premature labour; the others appear natural, because they almost always act at the same period, and rarely before the end of the ninth month.

582. Naturalists have formed different opinions concerning these latter; some attributing them to the *fetus*, and others to the *uterus* itself. The former have thought that the child, excited by the want of nourishment, the necessity of respiration, the troublesome weight of the *meconium* in the intestinal canal, &c. endeavours to get out, and overcome the obstacles which oppose its passage. Others have imagined that the *uterus* was excited to contraction only by the acrimony of the waters of the *amnion*, or by the

the violent distention which it suffers at the latter end of pregnancy. But these opinions have been so completely refuted, that it is scarcely worth while to take notice of them.

583. It can neither be the necessity of respiration, nor the want of nourishment, which causes the *fœtus* to solicit its expulsion, when it has been some time dead: nor can it be the stimulus of the waters of the *amnion* on the *parietes* of the *uterus* (even if they were as acrimonious as some have asserted), nor the violent distention of the fibres of that organ, that provoke the efforts of labour, when it comes on prematurely; since the waters are not in immediate contact with the *uterus*, and it is not in this case distended to its greatest degree.

584. The true determining cause of labour at full time certainly resides in the *uterus*: this cause seems to me to act constantly during the whole time of gestation, though its effects are not usually sensible till the end of the ninth month. The distended uterine fibres continually endeavour to expel the bodies which affect them disagreeably. If they are not able to compass it in the first periods, it is because they are not all equally solicited to it; and because, not being all developed at the same time, the action of some

is counterbalanced by the natural resistance of others.

585. In fact, the structure of that organ is such, that its neck resists during the first six or seven months of pregnancy, while the fibres of the *fundus* and body are obedient to the agents which distend them, and unfold themselves. But it is not so towards the latter end: the fibres of the neck, become more supple, furnish, as I may say, alone, the rest of the necessary expansion; so that, in less than two months, that part is entirely effaced, and so weakened, that it can no longer sustain the efforts of the others.—See par. 199, and following.

586. It is then that the action of the *fundus* is perceived on the contents of the *uterus*, which it pushes forward. If that action is not yet painful to the woman, its effects are manifest to the finger of the accoucheur, introduced at the orifice of the *uterus*, and applied to the membranes. See par. 414, and following.—This is the first degree of labour; though it is not generally allowed to begin till the commencement of the pains, and sometimes even very strong ones.

587. The epoch of the pains, which might pass for the second period of labour, is not very distant

distant from the first. Stronger contractions of the *uterus* very soon succeed to this species of prelude, which depends entirely on the tonic action of that *viscus*; and those contractions are manifested by so many pains.

S E C T I O N . II.

Of the natural Efficient Causes of Labour.

588. THE vulgar suppose that the child is the principal agent of its birth; that it opens the parts of the woman by repeated efforts, and thus surmounts the obstacles which oppose its exit. It is on this ground that we often hear asserted, that the weakness or death of the child always renders labour more tedious and painful. But this opinion can only be that of persons very little instructed concerning the phenomena which nature presents us in the course of labour. If, when the child is dead, labour sometimes becomes longer and more irregular for it, it is because the putrefaction which in some cases affects it, throws the powers of the *uterus* into a state of languor and prostration, as it does those of all

the organs employed in the animal functions; and because the *uterus* cannot contract with so much energy as in the usual state, &c.

589. The expulsion of the child is a function entirely dependent on the strength of the organs of the woman. Two kinds of action concur in it; that of the *uterus*, and that of the muscles which surround the abdominal cavity. The former is the principal, the latter is only accessory: this latter is subject to the will of the woman, in all periods of labour, except perhaps in the last moments; whereas the action of the *uterus* is absolutely independent on her.—See par. 238.

590. This latter is called contraction: like that of the muscles, it depends on a stimulus, and may be excited by a mechanical irritation.

591. The contractions of the *uterus*, always very weak at the beginning of labour, augment insensibly, and become very strong. Those of the first periods are called preparative; and those of the latter, determining or expulsive. But instead of the word *contraction*, which is only understood by those who have studied the art, *pain* is generally made use of.

592. The relaxation which always follows the contraction of the *uterus*, or the calm which succeeds

succeeds to each pain, presents as great a variety as the pains themselves. It is usually very long at the beginning of labour, and scarcely lasts three or four minutes towards the end.

593. These differences are not the same in all women, nor in the same woman in every labour. In some, the contractions of the *uterus* succeed each other with rapidity and force, and leave very little interval between each; in others, on the contrary, they are weak and seldom. In one labour they shall be very brisk, and in another extremely slow and lingering, though in the same woman; and on that generally depends the longer or shorter duration of labour. Its violence, on the contrary, is always in proportion to the obstacles which oppose the exit of the child; supposing the woman to be of the usual strength and constitution.

594. I have remarked, in par. 239, that all parts of the *uterus* contract at the same time. The tightening which may be perceived in the orifice of the *uterus* at the beginning of labour, and the stiffness of its edge in time of a pain, clearly prove that the action of that *viscus* is general; and that no part of it is at rest, as some have thought, while others are in action.

595. The effect of the contraction of the
uterus

uterus is, to diminish its cavity in every direction. If the child, pressed on all sides, is forced out of it, it is because the resistance it meets with is not equal in all parts : it always escapes at the place where there is the least.

596. If that place is almost always the orifice of the *uterus*, it is because the fibres are fewer in its vicinity than in all other parts ; because it is diametrically opposite to the center, which serves as a *fulcrum* to all its fibres ; because it is at the inferior part, and over the cavity of the *pelvis*, where it is no way fortified by the surrounding parts, as all other parts of the *uterus* are ; and, lastly, because all the efforts of labour are directed towards that point.

597. When the orifice cannot open, if all parts of the *uterus* resist equally, nature exhausts herself in vain, and labour at length ceases : but if any part of that organ is weaker than the rest, it tears ; and the child passes, either partly or totally, into the cavity of the *abdomen*.—See the article on the rupture of the *uterus*.

SECTION III.

Of the Causes accessory to the Action of the Uterus.

598. WE must be ignorant of the principal functions of the abdominal muscles, and of the *diaphragm*, to refuse them some share in the expulsion of the *fœtus*. It would be shutting our eyes to the light of experience and observation; for the proofs that they contribute to it are so evident, that no one can mistake them.

599. To excite the efforts of the woman; to recommend to her, at every pain, to bear down strongly—is it not, in fact, confessing the necessity and efficaciousness of all these muscles? If other proofs were necessary, they might be found in the example of those women who have expelled the *uterus*, loaded with the child, almost entirely from the cavity of the *abdomen*, by the efforts of labour.

600. These efforts are exactly similar to those a woman makes to go to stool, in a state of constipation. They determine the expulsion of the urine and excrements; they force the blood towards the superior parts, and cause a redness of the face, a heaviness of the head, &c. These efforts seem subject to the will in the first periods

riods of labour, for the woman can then suspend or accelerate them: but it is not the same in the last moments; and it is often in vain that we endeavour to persuade her to moderate them, in order to give the external parts more time to dilate, and by that means avoid tearing them; the consequences of which are sometimes very disagreeable.

601. By these efforts, the abdominal muscles and the *diaphragm* not only contribute to the expulsion of the *fœtus*, but becoming in some measure contiguous to the *uterus*, which they press, either mediately or immediately, on all sides, they serve for a support to it; and in many cases secure it from rupture, which without that support would be much more frequent than it is.

602. These muscles never act more efficaciously on the *uterus*, and the other abdominal *viscera*, than when the bones to which they are attached are fixed and immovable: therefore the contraction of a great number of other muscles becomes equally necessary in labour; but these latter only co-operate with the former in a very indirect manner.

603. While the *sterno-mastoidei* muscles, the *scaleni*, the *pectorales*, *major* and *minor*, the *serrati*, and others, fix the *thorax*, and prevent its obedi-

ence

ence to the abdominal muscles, the greater part of those destined to move the thighs and legs do the same by the *pelvis*.

604. If we cast our eyes on a woman left entirely to herself in the last periods of labour, it is easy to see that a contraction of all these muscles takes place. As soon as she feels that internal tightening which announces the pain, she endeavours to support her loins, throws back her trunk and head, fixes her feet and hands against the first solid body she can find, and holding herself quite stiff, pushes downward with all her force.

A R T I C L E II.

Of some of the principal Phenomena of Labour.

605. I THINK it is proper to explain some of the principal phenomena of labour; such as the pains, the dilatation of the orifice of the *uterus*, the discharge of *mucus* tinged with blood, and the formation of what is vulgarly called the gathering of the waters; before I indicate the order in which they manifest themselves, as well as several others which will be mentioned in the sequel.

S E C T I O N

SECTION I.

Of Labour Pains.

606. THE pains are the first sensible phenomenon of labour ; it is they which announce it, and no woman can bring forth a child without them.

607. They appear to be the immediate effect of the contraction of the *uterus* ; but that action must have passed through many degrees to become sensible. In the beginning, that contraction is so slight, that it merely produces an internal sensation like that of a *teneſmus*.

608. The violence of the labour pains is always in proportion to the force of the contractions which cause them. They are so slight in the beginning of labour, that they seem only like a gentle pricking. If they are sharper towards the end, it is because the contraction of the *uterus* is stronger, its fibres are more stretched, and become more sensible, and they act on a body which gives them a greater resistance. The violence which the edge of the orifice then undergoes is but an accessory cause.

609. The labour pains do not always manifest themselves in the same manner. Sometimes they

they begin at the loins, and shoot downward; sometimes they are felt at the navel, or other parts of the *abdomen*, from whence they pass to the small of the back, where they torment exceedingly. The best are those which are directed towards the orifice of the *uterus*, or the fundament.

610. It is with reason that women are more afraid of what they call pains in the loins, than of those which press briskly downward; because they advance the labour less, and they always produce, not that satisfactory calm which succeeds the latter, but an uneasiness and fatigue, which render them less supportable, and cause their return to be dreaded.

611. These pains of the back sometimes manifest themselves from the beginning of labour, at other times a little later; but they rarely continue to the end. It is difficult to assign the true cause of them: some assure us that they depend on the distention of the posterior round *ligaments* of the *uterus*, and others on the obliquity of that *viscus*. They seem to me to be more common in women who have the *placenta* attached to the posterior part of the *uterus*, than in others: however, we cannot attribute them solely to that cause.

612. It has been attempted, in all ages, to calm

this sort of pains. Bleeding and emollient clysters have sometimes succeeded; but in general those means have been employed in vain, at least with respect to alleviating those pains. What seems most likely to relieve them is, to lift the woman up a little, during each pain, by means of a napkin rolled up and passed under the loins.

613. There is another kind of pains, justly called false pains, relatively to labour, because they are foreign to it. They are generally pains of the intestines; and often deceive women who are uncertain of the period of their pregnancy, or who are in expectation of labour; because their principal effect is directed towards the fundament, like the true labour pains.

S E C T I O N II.

Of the Dilatation of the Neck of the Uterus.

614. THE orifice of the *uterus* is almost always a little open before the epoch of labour. We see the reason of it by following, step by step, the order of the development of that *viscus*, and by attending to all that passes at its orifice in the latter periods of gestation.

615. The cause of this first degree of dilatation being well known, must throw the greatest light upon that which takes place in time of labour; and shew us that it is not immediately and entirely the effect of that species of wedge which the substances subjected to the contractions of the *uterus* present to its orifice.

616. Although in many cases, where the waters drain off prematurely, no part of the child can engage in the orifice of the *uterus*, yet it does not fail to open, in the same manner as if the bag formed by the protrusion of the membranes were entire; from whence we see that the action of that organ is alone sufficient to effect the dilatation of its neck. But it will perform it so much the more easily as the *uterus* is more distended, and as the body it contains is more solid.

617. We must however allow, that the concurrence of all these causes renders the dilatation of the orifice more easy, and that it then requires fewer pains to effect it; for independently of the force which the membranes distended by the waters exert in the orifice, when they can engage in it like a wedge, the soft and gradual pressure which they continually make on all the neighbouring parts, determines a reple-

tion in them, which favours their development, and renders it less painful.

618. In general, it requires more time and labour to open the orifice of the *uterus* the breadth of a half-crown, than to obtain all the rest of the dilatation necessary for delivery. Young practitioners ought never to lose sight of this remark, when forming their prognostic on the duration of labour, that they may not expose women to be delivered alone, by supposing the time still far off, when very near.

619. Besides, the progress of this dilatation is not the same in all women, nor in all the labours of the same woman. Sometimes the orifice is more open at the beginning of labour, than at others after twelve or fifteen hours of strong pains; which depends on certain circumstances, which practice soon makes us acquainted with.

S E C T I O N III.

Of the Mucus, tinged with Blood, which drains from the Vagina.

620. THE parts of the woman, naturally humid, are never more so than in the latter periods
of

of gestation, and during labour. The glands of the neck of the *uterus*, and of the *vagina*, then produce a larger quantity of *mucus*; and there is besides a kind of exsudation of the waters of the *amnion* through the pores of the membranes; so that, in the greater part, there is a discharge of a *mucous serosity*, more or less abundant.

621. In some women this serous and glairy *mucus* is tinged with blood at the approach of labour, and in others not till after it is begun. This coloured glair is commonly looked upon as a proof that the dilatation of the orifice is well advanced, and as a presage of a speedy delivery; which however is not always true, since these red marks may appear several days before.

622. No women mark more abundantly than those whose labour comes on suddenly, or augments all at once; and especially than those in whom the *placenta* is attached near the neck of the *uterus*: which may make us presume that the blood which colours these humours, or which flows unmixed, proceeds from the rupture of some of the vessels of the *placenta*, or of the *chorion*.

SECTION IV.

Of the Gathering of the Waters.

623. In proportion as the orifice of the *uterus* is dilated, the membranes are protruded through it, and form a tumour in the *vagina*, which is tense in time of a pain : this is what is called the gathering of the waters.

624. This tumour seldom extends far beyond the circle of the orifice before it is large enough for delivery ; on which account, when it is found so, it is said the waters are well gathered.

625. Whenever the orifice of the *uterus* answers to the center of the *pelvis*, dilates equally, and the membranes are of an ordinary texture, they form a round bag, similar to a portion of a sphere ; but when the orifice rests against any part of the *pelvis*, or cannot open circularly, that bag becomes more or less of an oval figure ; lastly, when the membranes are of a loose texture, it lengthens like a pudding ; without however causing the child to present a hand, or a foot, as some have advanced.

626. The portion of the membranes which forms the tumour, not being always able to resist the violent impulse of the waters pushed forward by the action of the *uterus*, grows insensibly

fribly weaker, and at length bursts. But the bursting of the membranes does not take place constantly at the same time, nor at the same point of the orifice of the *uterus*: sometimes it happens at the beginning of labour, and sometimes at the latter end; sometimes they tear at the center of the orifice, and at other times above its edge: which produces different phenomena, that will be explained in the sequel.

627. When the membranes are of a delicate texture, they almost always tear at the beginning of labour, which often renders it longer and more difficult; not because, as the vulgar think, when the waters are evacuated prematurely, the labour is dry; but because one of the causes which ought to co-operate in the dilatation of the orifice, fails before it is effected: for the waters never moisten and relax the parts of the woman more than when they drain off slowly.

628. When the membranes do not burst till the labour is at its height, the waters, impelled by the force of the pain, escape with rapidity, and with a jet proportioned to the extent of the rupture. The *uterus*, already briskly irritated, soon recovers from the inactivity into which this sudden evacuation throws it, and afterwards contracts with more force than before. But

things go on in a different manner in the case which makes the subject of the preceding paragraph. In that case, it is very common to see the pains slacken for a longer or shorter time, because the *uterus*, being still in that state of torpor which accompanies pregnancy, finds itself relieved every instant by the discharge of a new portion of water.

629. When the membranes open at the middle of the orifice of the *uterus*, all the water contained below the head drains off instantly, and the labour continues to augment; but when they tear towards one of its sides, near the edge of the orifice, or above it, the bag only empties itself in part. It still preserves water enough to be distended during the pains, as before its rupture; and the rest of the waters drain off, as I may say, only by exsudation: which often induces that languor in the labour mentioned in the preceding paragraph, and which will be more amply treated in the sequel.

630. If we do not tear this bag, or if it does not burst a second time of itself, the child's head, in proportion as it advances in the orifice, drives away the waters still contained in the bag, either towards the former opening, or back again into the *uterus*. The head then applying itself immediately

mediately to the membranes, pushes them before it, and thus clears the *vulva*; so that the child, as the vulgar express it, is born with a caul.

631. The membranes do not always burst of themselves; and in some cases, where they are very tough, if we were not to tear them, we should see the *fœtus* expelled contained in its *involucra*, and bringing its *placenta* along with it, in the same manner as in abortions in the first periods of gestation. This mode of birth, which is not common at the natural period, may have consequences too disagreeable for us not to prevent them by tearing the membranes seasonably, as will be directed hereafter.

S E C T I O N V.

Exposition of the preceding Phenomena, and of some others, according to the Order in which they generally happen.

632. LABOUR is almost always announced by sensible alterations in the animal œconomy; but they are, as I may say, different in each individual. These symptoms are presently succeeded by slight pains in the loins, accompanied by

a hardness of the uterine globe, and a kind of internal tightness which the women can scarcely express.

633. Touching discovers to us that, at the instant of these pains, the orifice of the *uterus* contracts a little, that its edge stiffens, and that the membranes which cover it are more or less distended. All these symptoms augment in the course of labour, except the first; for the orifice afterwards, far from contracting, is obliged to enlarge at every pain.

634. In the second period of labour the pains become stronger and more frequent; the orifice of the *uterus* enlarges, its edge develops, and often becomes extremely thin; the tumour formed by the membranes becomes more considerable; and at every pain the child's head seems to go higher, so that it is never farther from the finger than at this moment. The woman feels a weight below, which invites her to make some gentle efforts, like those caused by a *tenesmus*; and the neck of the *uterus* seems to descend a little, because the whole body of it is pushed towards the *pelvis* by the action of the abdominal muscles.

635. After the pain, things return to the same state they were in before; the edge of the orifice
slackens,

flackens, the membranes become flaccid, the child's head descends again, driving away the waters to the sides, and applies itself to the membranes.

636. In the third period of labour, which is that of its greatest force and violence, the pains succeed each other more rapidly; they are sharper and longer; the woman is more forcibly excited to assist them, and she supports them better than before. If the calm which succeeds each pain is shorter, at least it is quieter and more perfect; and is not commonly troubled by any of those uneasinesses which the first pains often leave behind. The orifice of the *uterus* augments so much, that it almost equals the whole breadth of the *pelvis*.

637. The glandular *follicles* scattered through the whole substance of the *vagina*, and neck of the *uterus*, at this time discharge a greater quantity of *mucus*; and this is the time when that humour begins to colour more or less with the blood which escapes from the little ruptured vessels: so that it is the period of labour when some women mark the mott, and in which the greater part begin to do it.

638. At this epoch likewise a great number of other symptoms appear, and the former acquire more force and intensity. The pulse becomes
more

more hard and frequent, but it is almost always irregular ; the face grows red, the eyes inflame, and the heat extends to all parts ; and the disorder of the whole frame becomes so general, that all its functions seem deranged.

639. The rupture of the membranes comes seasonably to calm this universal agitation, by the relaxation which the evacuation of the waters produces : but this repose is usually of short duration ; still stronger pains soon disturb it, and give birth to new phenomena, which announce the termination of labour.

S E C T I O N VI.

Of the Phenomena of the Last Period of Labour.

640. THE *uterus*, applied immediately to the child's body, after the evacuation of the waters, contracts more briskly than before. The head engages in the orifice, and approaches the *vulva* at every pain ; so that, when all things are well disposed, the delivery is terminated in a very little time. But all these efforts are fruitless when the child is in a bad position, or the *pelvis* deformed.

641. In

641. In the first case the orifice of the *uterus* continues to descend and enlarge during the pain, till the thickness of the head, taken between the *parietal protuberances*, has passed it: it then suddenly retracts; and, though the pain continue, it closes a little, and its edge thickens.

642. The time when the head begins to fill the *vagina*, is not always that in which it arrives at the bottom of the *pelvis*; it may remain there a long time, and even in some measure appear at the *vulva*, enveloped in the neck of the *uterus*; but it cannot be completely in the *vagina* without at the same time occupying the cavity of the *pelvis*. We shall frequently in the sequel perceive the utility of this remark.

643. When the head is large relatively to the *pelvis*, and especially when the *sacrum* is a little flattened, the compression which it exerts on the *sacral* nerves, causes painful cramps in the posterior part of the thighs, and sometimes numbnesses, and tremblings which are difficult to calm.

644. These cramps are seldom felt in both thighs at the same time; because it is not common for the head to compress equally the *sacral* nerves on both sides. Sometimes they affect the right thigh, and sometimes the left, according to
the

the position of the head, and its relation to the nerves in question.

645. These same pains are sometimes felt in the anterior and internal part of the thighs ; but in that case they are felt a little sooner, and almost always before the head is entirely in the cavity of the *pelvis* : they may be attributed to the compression of the *sacral* and *obturator* nerves.

646. As soon as the head is completely in this cavity, many women complain of a want to go to stool ; and some, for fear of discharging their excrements on the bed, dare not give themselves up to the efforts which they exerted before with so much success, and to which they are then so strongly excited ; which more or less retards their delivery.

647. But this sensation is very often illusive : and if we were to permit all women who feel it to place themselves on the closet stool, we should have the mortification to see some of them delivered in that attitude ; which might have disagreeable consequences, either to themselves or their children.

648. When this sensation is felt, if the *perinaeum* yields easily, we see it stretch at every pain, on the child's head, which pushes it outward. The *vulva* dilates in the same manner, and

and delivery is soon terminated. But when it is thick and solid, and all the parts resist, as usually happens in a first labour, delivery is often several hours distant still.

649. In this latter case, though the *perineum* distends, and is forced outward during every pain, it shrinks immediately afterwards; and the head, which was visible at the *vulva*, recedes, and returns again into the *pelvis*. These effects are repeated in the same order, till the *parietal protuberances* have passed below the anterior part of the *tuberosities* of the *ischia*: then the *perineum* remains distended; and the head, which appears almost entirely developed in it, no longer remounts after the pain.

650. Accoucheurs generally attribute the return of the head, after each pain, to the twisting of the umbilical cord round the child's neck, and have proposed divers means for facilitating delivery in that case. It will perhaps appear surprising that I should rise up against so many authorities, and assign no other cause for this effect but the elasticity of the *perineum*, and of the bones of the *cranium*: but reason and experience join to prove that it depends on no other.— See par. 1188, and following.

651. When the head is so far descended as
not

not to return again after the pain, the *perinæum*, then much distended and very thin, not being able alone to sustain the united efforts of the *uterus* and the abdominal muscles, is in the utmost danger of tearing. To prevent this accident, we ought to direct the woman to suspend or moderate those efforts which depend on her will; while the accoucheur supports the *perinæum* with the palm of one hand, in order to counterbalance the rest, till the external parts be sufficiently dilated for the passage of the child.

652. At the moment when the greatest breadth of the head presents to the *vulva*, the *carunculæ myrtiformes* disappear, the *nymphæ* diminish, and the *fourchette* commonly tears *. To this, the most painful moment of labour, succeeds a calm, till then unknown to the woman; and that calm, joined to the joy of being a mother, renders this instant inexpressibly agreeable.

653. But new pains would soon come, and disturb this delicious moment, if the accoucheur should abandon the expulsion of the child's trunk,

* The rupture of the *perinæum* does not always begin at the middle of its anterior edge, and extend towards the *anus*; it has sometimes opened in the center, and given a passage to the child, while the *frænum* or *fourchette* has remained entire. —See par. 152.

and of the *placenta*, to nature alone ; for the spontaneous exit of either could not be accomplished without a great number of contractions of the *uterus*.

654. In many women these pains are repeated during the first days of lying in. They are then excited by the presence of clots which are formed in the *uterus*, or by the fulness of the vessels of that organ ; they are called *after-pains*. If the first labour is in general the longest and most painful, women are in some measure recompensed by the absence of these pains, which are much less common after the first, than after succeeding labours.

C H A P. II.

Of Natural or Unassisted Labour, and the various Kinds of it.

655. **I**F we comprehend in the class of natural labours all those in which the woman might be delivered without help, we may divide them into four general species, each of which may be subdivided into particular ones. 1. Those where the child presents the head. 2. Where it comes by the feet. 3. Where it presents the knees. 4. Those in which it presents the breech.

656. A natural delivery always depends on the concurrence of several causes, some of which depend on the mother, and some on the child. It may be more or less easy or difficult, as those causes concur in a greater or smaller number; or according to the number that are wanting.

657. A good conformation of the *pelvis*, a sufficient degree of strength, a favourable situation of the *uterus*, a suppleness of its neck, and of the parts which form the *pudendum*, are, on the side of the woman, the conditions requisite for a natural delivery.

658. On

658. On the part of the child, its volume must not surpass the extent of the openings of the *pelvis*, and it must present to the orifice of the *uterus* one of the parts indicated in par. 655; that is to say, the head, the feet, the knees, or the breech.

A R T I C L E I.

*Of the First general Species of Natural Labour,
or that in which the Child presents the Head.*

659. BY this generical term, of a child presenting the head, I give notice that I mean only that region of it called the *vertex*; intending to speak of the others in another place.

660. This first general species of labour, which is the most natural in all respects, has in itself essential differences, relatively to the manner in which the head may present to the superior *strait*. Among the various positions which the region of the *vertex* is susceptible of, I shall distinguish but six, which will constitute so many particular species of labour.

SECTION I.

Distinguishing Signs of the Vertex, and of its different Positions.

661. A ROUND tumour, of a certain extent, and pretty solid, on which we may distinguish several *sutures* and *fontanelles*, characterizes the *vertex*, or the superior part of the head.

662. It is the direction of the *sutures*, and the situation of the *fontanelles*, with respect to the *pelvis*, which enable us to judge of the position in which the *vertex* or crown of the head presents. It is often sufficient for that purpose to touch either of the *fontanelles*.

663. In the first position, the *sagittal suture* cuts the *pelvis* obliquely from left to right, and from before backward. The posterior *fontanelle* is situated behind the left *acetabulum*, and the anterior before the right *sacro-iliac symphysis*.

664. In the second position, the *sagittal suture* also traverses the *pelvis* diagonally, but passes from the right *acetabulum* to the left *sacro-iliac symphysis*; so that the anterior *fontanelle* is before the latter, and the posterior behind the former.

665. In the third position, the posterior *fontanelle* answers to the *symphysis* of the *pubes*, the
anterior

anterior to the *sacrum*, and the *sagittal suture* is parallel to the small diameter of the superior *strait*.

666. In the fourth position, this *suture* is directed as in the first; with this difference, that the anterior *fontanelle* answers to the left *acetabulum*, and the posterior to the right *sacro-iliac symphysis*.

667. In the fifth, the *sagittal suture* is likewise directed obliquely with respect to the *pelvis*; the anterior *fontanelle* being situated behind the right *acetabulum*, and the posterior behind the left *sacro-iliac symphysis*.

668. Lastly, in the sixth position, the anterior *fontanelle* is behind the *symphysis* of the *pubes*, and the posterior before the *sacrum*; the *sagittal suture* being directed as in the third position.

669. We might multiply the positions of the head still more, since it may take middle ones between those I have stated: perhaps some will do so, while others will think I have already made them too numerous. The sequel will shew to the latter, that we ought not to establish a smaller number; and to the former, that these six positions are sufficient for the perfect understanding of the mechanism of labour in all other cases.

670. Some of these positions are not met with

so frequently as others. It has appeared to me that the proportion of the first to the second, was as seven or eight to one; and to the fourth and fifth, as eighty, or even an hundred to one: as to the third and sixth positions, they are excessively rare; though most accoucheurs have thought, and still think, that the third is the the most natural and usual.

671. These six positions not being equally favourable to the exit of the child, may be distinguished into good and bad. For the head to be well situated, it must present diagonally to the superior *strait*, and in such a manner that the *occiput* may turn under the arch of the *pubes*, as soon as it is descended into the cavity of the *pelvis*. The two first positions are the best; the third may also pass for such, when the *pelvis* is of the natural size. The others, and especially the sixth, would often justly merit the title of bad positions, if the dimensions of the child's head were not pretty constantly much smaller than those of the *pelvis* of the woman: for notwithstanding this favourable relation of the head to the *pelvis*, yet it cannot disengage from it in all these cases without a great deal of trouble; as we shall see in the sequel.

672. The best positions of the head with respect

spect to the superior *strait*, are not so with respect to the inferior; for it cannot take a more favourable one at the latter, than that where the *occiput* answers to the arch of the *pubes*. The head may also engage in the *pelvis* in such a manner as to meet the greatest obstacles to its progress, though it had at first presented in the most advantageous position at the superior *strait*; which depends on the concurrence of several causes, whose presence adds so considerably to the natural difficulties of labour, that we are often obliged to lend our assistance to terminate it.

673. It is necessary then, for the easy performance of this function, that the head, besides the conditions already stated, should follow a determined course; but different, in some respects, in each of the six positions which I have established.

S E C T I O N II.

Of the Mechanism of Natural Labour, where the Child presents the Crown of the Head in the First Position.

674. WHEN we consider the position of the head which constitutes this species of labour, it is

easy to figure to ourselves the situation of the *trunk* and other parts of the child in the *uterus*; and to see that the back, and hind part of the head, answer to the anterior and left lateral part of that *viscus*; the face, the breast, and the knees, to the posterior and right lateral part; the feet and breech being situated towards the *fundus*.

675. This diagonal position of the head is not the effect of the first labour pains, as one of the most celebrated accoucheurs of the present age has supposed *. It is not the pressure which the forehead suffers against the *sacro-vertebral* angle during those first pains which obliges it to turn away from it; it answers to one of the sides of that protection long before the epoch of those pains: and if we only recollect the figure of the head, and its relations to the surrounding parts, we shall see that it would be difficult for it to take a more convenient position.

676. At the beginning of labour we often find the middle of the *sagittal suture* at the center of the *pelvis*; but this point recedes afterwards, to give place to one of the *fontanelles*, and almost always the posterior, which usually descends and presents itself foremost.

* M. *Levret*, Suite des Accouchemens Laborieux, edit. quatrieme, p. 290, &c.

677. In the natural order, the first contractions of the *uterus* bend the head on the anterior part of the *trunk*, till the chin rest against the upper part of the breast. During this time the posterior *fontanelle* approaches more or less to the center of the *pelvis*; and the head in that state of flexion continues to descend in the direction of the axis of the superior *strait*, till stopped by the inferior part of the *sacrum*, the *coccix*, and the *perinæum*: one of the *parietal protuberances* passing before the left *sacro-iliac symphysis*, the other behind the right *acetabulum*.

678. The touch discovers to us that a little more than the posterior and superior fourth of the right *parietal* bone then answers to the arch of the *pubes*; that the right branch of the *lambdoidal suture* answers to the left limb of that arch; and that the other branch of that *suture* is towards the left *ischiatric* notch.

679. The head cannot remain long in that state. Pressed by new efforts, and not being able to follow its former direction, it passes forward along the inclined plane offered it by the *sacrum*, the *coccix*, the *perinæum*, and sides of the *pelvis*; but in such a manner that, in descending thus, the *occiput* turns by a pivot-like motion under the arch of the *pubes*, with which it has

a strong relation, both in its form and dimensions.

680. This pivot-like motion, by which the *occiput* turns under the *pubes*, depends entirely on the twisting of the child's neck: we may estimate it at about the sixth or eighth of a circle. It is very necessary to observe that, during this motion of the head, the trunk executes nothing of the kind in the *uterus*.

681. After this rotatory motion, we find the posterior *fontanelle* towards the middle of the arch of the *pubes*; from whence the *sagittal suture* goes backwards, rising obliquely towards the projection of the *sacrum*, under which the anterior *fontanelle* is then situated. Each branch of the *lambdoidal suture* crosses the common branch of the *ischium* and *pubis* of the same side; and the nape of the neck rests against the inferior edge of the *symphysis*.

682. The chin, which had been applied to the breast, begins at this period of labour to recede from it; and the *occiput* engages under the *pubes*, dilating the *vulva*, and rising up before the *mons veneris*; or, which is the same thing, turning backward, if we speak only with respect to the child.

683. In this last period the head describes almost

most a quarter of a circle, turning round the inferior edge of the *pubes*, like a wheel round its axle-tree. In this movement, the center of which is the nape of the child's neck, the *occiput* passes through a very small space in rising towards the *pubes* of the mother; while the chin describes a very extensive curve behind, passing successively over every point of a line which would divide the *sacrum*, *coccix*, and *perinæum*, longitudinally into two equal parts.

684. The chin has scarcely cleared the *vulva* before the face turns towards one of the woman's thighs; but almost always towards the right, and rarely towards the left*: which depends on the twist the child's neck has undergone at the time indicated in par. 679.

685. In this species of labour, the shoulders, which had engaged obliquely in the superior *strait*, present themselves differently at the inferior. The right shoulder turns towards the *pubes*, and the left towards the *sacrum*; so that their greatest breadth becomes parallel to that of this

* When the child's face turns towards the left thigh, the trunk clears the *vulva*, with a sort of twist, or demi-rotation: which only takes place when the effort which turns the head in the cavity of the *pelvis*, is continued long enough to expel it, and the trunk also.

strait.

strait. After this change, the left shoulder continues to advance towards the bottom of the *vulva*, where it appears before the right has disengaged from under the *pubes*.

686. The shoulders being delivered, the rest of the *trunk* comes along with the greatest facility, on account of its conical and lengthened form.

687. By following step by step the course I have just traced from observation, it will appear, 1. That in all periods of labour the head presents its smallest diameters to the *pelvis*, and that it passes through it presenting only its smallest circumference. 2. That it executes three different motions in this passage: that of flexion forward, in the first period; the pivot-like, or rotatory motion, in the second; and, lastly, that of flexion backward, at the time it disengages from under the *pubes*.

688. Nature cannot deviate from this course, but the delivery must in consequence become longer and more difficult; and often impossible without assistance. In fact, the head cannot descend otherwise, without presenting its largest diameters to the *pelvis*, and turning the *occiput* on the back as it engages; and without presenting the forehead, or the anterior *fontanelle*, to the
center

center of the inferior *strait*: which will not permit it to execute the rotatory motion already mentioned, nor to disengage itself, except when the *pelvis* is extremely spacious.—See par. 1278, and following.

689. Those who perfectly comprehend what I have said of the relation of the dimensions of the child's head to those of the *pelvis*, and of the manner in which the expulsive forces of the *uterus* are propagated, will easily conceive the source of the numerous obstacles we often meet with; and will see that it is as easy to prevent, as difficult to surmount them when they have taken place.—See the paragraphs indicated at the end of the preceding one.

S E C T I O N III.

Of the Mechanism of Natural Labour, where the Child presents the Crown of the Head in the Second Position.

690. THIS position of the head, whose characters are described in par. 664, will appear as favourable to the exit of the child as the first, if we

we only attend to the relation of the dimensions of the head to those of the *pelvis*. In both these positions the *sagittal suture* is directed according to one of the oblique diameters of the superior *strait*; and the *occiput* is equally distant from the *symphysis* of the *pubes*, under which it must pass in the sequel.

691. Nature, however, often finds obstacles in this second position, which she very rarely meets with in the first: the right lateral obliquity of the *uterus*, which is much more frequent than the left; the situation of the *rectum* with respect to the *sacrum*, and the hardened *feces* which it often contains—appear to be the principal sources of them. The first of these causes obliges the head, as it engages in the *pelvis*, to follow that disadvantageous course indicated in par. 1278; and the second obstructs the rotatory motion by which the *occiput* must turn under the *pubes* in the last period: the *rectum*, on the left side of which the forehead is then placed, hindering it from passing freely into the hollow of the *sacrum*.

692. The mechanism of delivery in this position, when the *uterus* has not deviated, and all other things are well disposed, is entirely similar to that of the first position. The *occiput* descends
in

in the same manner into the cavity of the *pelvis*; and afterwards turns under the arch of the *pubes*, and disengages itself by turning on the inferior part of the *symphysis*, while the chin describes backward a very long curved line, as stated in par. 683.

693. As soon as the head is delivered, the face turns towards the mother's left thigh; as it turned towards the right, after disengaging from the first position *: the left shoulder presently places itself under the *pubes*; and the right goes towards the *sacrum*, to advance in the order indicated in par. 685.

S E C T I O N IV.

Of the Mechanism of Natural Labour, where the Crown of the Head presents in the Third Position.

694. Most accoucheurs, even at this day, imagine that the head generally presents in this position (see par. 665). It is not very easy to

* It sometimes also turns towards the right thigh. The mechanism of this movement is the same as that indicated in the note on par. 684.

discover

discover the source of their error, unless it be a too blind attachment to the doctrine of their masters. Nature furnishes us every day with proofs of the contrary; for we very rarely find the head in this situation at the beginning of labour.

695. This third position will perhaps appear less advantageous than the two preceding, because the longitudinal diameter of the head is parallel to the smallest diameter of the superior *strait*; but if we recollect that this latter is generally four inches in extent, and that the diameter of the head in question scarcely ever advances foremost, we shall see that delivery may sometimes be as easy in this case as in the former.

696. When the *uterus* is not inclined to either side, the head engages in the *pelvis* according to the usual laws; the *occiput* descends behind the *symphysis* of the *pubes*, while the chin rises towards the breast; so that the head only presents its height, or perpendicular diameter, to the small diameter of the superior *strait*.

697. As soon as the *vertex* is arrived at the inferior part of the *sacrum*, we find the *occiput* placed under the arch of the *pubes*, to which it naturally answers in this position; and the head disengages as in the two former (see par. 682 and

683). After that is disengaged, the shoulders present at the inferior *strait*, as stated in par. 685; but sometimes it is the right shoulder which goes backward, and sometimes the left: whereas in the other positions their course is almost constant.

698. The anterior obliquity of the *uterus* being pretty frequent; and the attitude a woman often takes, before the violence of labour obliges her to lie down, being likely to increase it—if the head always presented in the third position, it would often descend with the *occiput* turned on the back, and would present the forehead to the center of the inferior *strait*: which might render delivery extremely difficult, and even impossible, without help.—See par. 1278, and following.

S E C T I O N V.

Of the Mechanism of Natural Labour, where the Crown of the Head presents in the Fourth Position.

699. IN this species of labour, the position of the head (see par. 666) is such, that its delivery becomes

becomes exceedingly difficult when the *pelvis* is not extremely large, relatively to the volume of the head; because the face turns gradually upward, and presents the forehead to the arch of the *pubes*.

700. When every thing is in the natural order, the *occiput* descends into the *pelvis*, passing before the right *sacro-iliac symphysis*, till the posterior and superior part of the right *parietal* bone rest on the lower part of the *sacrum*. At this time, the head being obliged to turn on its pivot, the *occiput* passes into the curve of the *sacrum*; and the forehead sliding along the inclined plane of the left side of the *pelvis*, goes under the *pubes*.

701. It sometimes however happens, but unfortunately for the women too seldom, that the head in its descent approaches to the second position; so that the *occiput* turns forward, instead of going into the curve of the *sacrum*.

702. These examples of the fourth position reduced, as it were, spontaneously to the second, and from that to the most usual one at the inferior *strait*, indicate what we ought to do, in order to save the woman from the difficulties of this species of labour; for, by attempting it
early,

early, the accoucheur may always determine the head to take that favourable direction.

703. The forehead being placed under the *pubes*, as stated in par. 700, we find the anterior *fontanelle* at the middle of the arch, and the posterior above the point of the *sacrum*. While this latter continues to advance forward along the *coccix* and *perinæum*, the forehead, placed opposite the arch of the *pubes*, and not being able to engage in it as the *occiput* does in the former positions, is obliged to remount behind the *symphysis*, against the inferior edge of which the anterior *fontanelle* is then strongly pressed, till the posterior appear at the bottom of the *vulva*.

704. At that instant the anterior edge of the *perinæum*, much more distended than in the former positions, not being able to remain on the summit of the inclined and slippery plane of the occipital region, retires backward towards the child's neck. There it becomes the center of motion on which the head must turn, in disengaging from the *pelvis*.

705. In this fourth species of labour the *occiput*, as soon as it is delivered, turns backward on the *perinæum*, or towards the *anus* of the woman, while the face disengages from under the *pubes*, and the chin describes a curved line, of

the same extent as that it describes backward, in the three former positions, before it appears at the bottom of the *vulva*; but in a contrary direction. The chin scarcely appears without, before the face turns half round towards the mother's left thigh, as if to look at the groin of that side. During this time the left shoulder places itself under the *pubes*, and the right goes towards the *sacrum*, to disengage first.

706. This species of labour, always much more difficult than the preceding, may become much more so still, by various circumstances which too often complicate it, and especially on account of a right lateral obliquity of the *uterus*.

SECTION VI.

Of the Mechanism of Natural Labour, where the Child presents the Crown of the Head in the Fifth Position.

707. THE relation of the dimensions of the head of the *fœtus* to those of the *pelvis* of the mother, in the position which constitutes this species of labour (see par. 667), being absolutely the same as in the preceding, the mechanism by which the extrusion of the child is per-

formed must, *cæteris paribus*, be also perfectly the same.

708. The *occiput* descends first into the cavity of the *pelvis*, passing before the left *sacro-iliac symphysis*, as it does before the right in the fourth position. It afterwards turns towards the middle of the *sacrum*; while the forehead, sliding along the right side of the *pelvis*, places itself under the *pubes*: after which the whole passes in the order stated in par. 703 and following; except that, when the face is delivered, it turns obliquely towards the right groin; the right shoulder slides under the *pubes*, and the left towards the *sacrum*, in order to follow the course which has been already assigned them.

709. Sometimes the *occiput*, instead of turning towards the *sacrum*, gradually approaches the left *acetabulum*, in proportion as the head descends in the *pelvis*; so that this fifth position is insensibly reduced to the first. If the efforts of nature do not always reduce the head to this advantageous position, in this species, at least they point out the course we ought to make it take, in order to procure the woman this often inestimable advantage.

710. Sometimes also this species of labour, often difficult in itself, on account of the ten-

dency of the face to place itself under the *pubes*, in proportion as the head descends in the *pelvis*, becomes much more so, from accidental circumstances, and especially from a left lateral obliquity of the *fundus uteri*.

SECTION VII.

Of the Mechanism of Natural Labour, where the Crown of the Head presents in the Sixth Position.

711. THIS species of labour is the most rarely met with of any, where the crown of the head presents; the cause of which no doubt is, that the back of the head being round, and very slippery, cannot, on account of the mobility which the child enjoys till after the evacuation of the waters, remain against the projection of the last *lumbar vertebra*, which offers it, on each side, spaces better adapted to its figure.

712. We should be in an error if we supposed that the head presented thus at the superior *strait*, every time we see the face disengage from under the *pubes* at the latter end of labour; for this position is generally the effect of the rotatory motion which the head executes in descending,

scending, when it presents diagonally, whether in the fourth or fifth positions described above.

713. Though this species of labour, in which the face comes upward, is allowed by all accoucheurs to be the least favourable of the six, it is also very happily the least common. Its difficulties depend much less on the presentation of the length of the head parallel to the small diameter of the entrance of the *pelvis*, as some perhaps may think, than on the inevitable presence of the face under the *pubes* in the last period.

714. In the sixth position of the head, when the *pelvis* is well formed, the *occiput* descends before the *sacrum*, as it does before the *sacro-iliac symphyses* in the fourth and fifth positions. The posterior *fontanelle*, which we always take for a guide, passes successively over every point of the curved line mentioned in par. 683, to present itself at the middle of the crescent formed by the lower part of the *vulva*, when the *perinæum* is much distended. At this instant the anterior edge of the *perinæum* retires towards the *anus* of the woman and the neck of the child, as observed in par. 704; the *occiput* immediately begins to turn back the same way; and the face disengages from under the *pubes*, according to the course indicated in par. 705.

715. As soon as the chin is delivered, the face turns towards one of the woman's groins; but indifferently towards the right or the left, without our being able to assign a particular reason for it.

716. The shoulders presently afterwards present their greatest breadth to the length of the *vulva*; one of them turning towards the *pubes*, the other towards the *sacrum*; in order to disengage as in the five former species of labour which I have just described.

717. If this sixth species of labour is constantly more difficult than the preceding, when things pass in the most favourable manner, to how many obstacles does nature find herself opposed, when any of the stated conditions are wanting, or when other circumstances complicate it!

S E C T I O N VIII.

Remarks on those Labours where the Child presents the Crown of the Head.

718. THE head may, without doubt, present at the entrance of the *pelvis*, in a manner different from those I have been describing. The *sagittal*

sagittal future does not always follow exactly the directions assigned; and the posterior *fontanelle* does not constantly answer to those points of the superior *strait* which I have stated. This *fontanelle*, which we are always to take for a guide, sometimes corresponds to the intermediate spaces between those six points; so that we might distinguish six other positions, which might be again subdivided into as many more.

719. This distinction would not only be useless and superfluous, but might confuse the ideas. There is not, in fact, any of these middle positions which may not be referred to one of the six first; and every one of them ought with so much the more reason to be designed by the name of that among the six to which it approaches the nearest, as the mechanism of delivery in it is exactly the same.

720. These intermediate positions ought to be referred to the three first as often, for example, as the posterior *fontanelle* answers to any point of the anterior semi-circumference of the *pelvis*; because that *fontanelle* turns gradually towards the *symphysis* of the *pubes*, under which the *occiput* places itself in the sequel.

721. The head sometimes follows this direction, even though the *fontanelle* in question be

placed opposite one of the *sacro-iliac symphyses* at the beginning of labour: but when it is more backward, and answers to some point in the posterior third of the superior *strait*, all those positions ought to be referred to the three latter, that is to say, to the fourth, fifth, or sixth; because the *occiput* constantly turns, in descending, towards the *sacrum*, and the forehead under the *pubes*.

ARTICLE II.

Of the Second general Species of Natural Labour, or that in which the Child presents the Feet.

722. ALTHOUGH experience has frequently proved that a woman might be delivered without help, of a child presenting the feet, it is still customary to class this sort of labours among those called preternatural, and to treat them as such. I shall not examine scrupulously whether it be right or not; considering here purely and simply as natural, those labours where the child presents the feet: I reserve to myself the liberty of treating their particular indications, according to circumstances, in another place.

SECTION I.

Of the Signs which indicate that the Child presents the Feet,

723. THOSE labours where the child presents the feet, come on in the same manner as the preceding, and are accompanied by the same phenomena, till the opening of the membranes.

724. It is generally so easy to distinguish the feet, that I think we may dispense with a description of their characters; but it is not always so easy to discover their true position, and judge by that of the position of the *trunk* and head of the child in the *uterus*; because of the extreme mobility of the legs and thighs, and even of the feet. Indeed we need not trouble ourselves much about it, before these latter, and even the breech, appear without; since the greatest difficulties of labour, in these cases, proceed only from the volume of the shoulders and head, or from the manner in which those parts present at the superior *strait*.

725. Relatively to these latter parts we shall distinguish four principal positions, to which all others may be referred. These four positions will constitute so many species of labour.

726. In

726. In the first position of the feet, the heels answer to the left side of the *pelvis*, and a little forward; the toes to the right side, and backward, nearly opposite the *sacro-iliac symphysis*. Above that *symphysis* are placed the breast and face; while the back is situated under the anterior and left lateral part of the *uterus*.

727. In the second position the heels are towards the right side of the *pelvis*, and the toes to the left, and a little backward. The *trunk* and head are so situated, that the breast and face answer to that part of the *uterus* which is over the left *sacro-iliac symphysis*, and the back to the anterior and right lateral part of that *viscus*.

728. In the third position, the heels are turned towards the *pubes*, and the toes to the *sacrum*. The child's back is under the anterior part of the *uterus*, and its breast answers to the *lumbar* column of the mother.

729. The fourth position is exactly the reverse of the third: the child's back and heels are towards the posterior part of the *uterus*; while the toes, the face, and breast, are under its anterior part.

SECTION II.

Of the Mechanism of Natural Labour, where the Child presents the Feet in the First Position.

730. IN this position, as well as in the other three, the feet cannot descend but as they are pushed down by the breech, against which they are placed. They sometimes advance with difficulty, because the legs, crossing one another casually in the *pelvis*, produce considerable obstacles to their descent.

731. When they are without, the breech soon appears at the *vulva*, where it almost always presents diagonally; the left hip, in this first position, answering to the right limb of the arch of the *pubes*, and the right hip to the left *sacro-ischiatic ligament*. The breech continues to advance in that direction, rising a little towards the *mons veneris*, in proportion as the *trunk* disengages; because it is forced to bend a little to one side, to accommodate itself to the curve of the *pelvis*.

732. While things go on thus with respect to the *trunk*, before our eyes, whether in this first position of the feet, or in the three others, the child's arms are raised towards the lateral regions

regions of the head ; following a course which it is easy to form an idea of, if we recollect their natural situation at the sides of the breast.

733. When the arm-pits arrive at the superior *strait*, the *trunk* would be stopped, and cease to descend, because of the projection of the arms, if the shoulders, though placed according to one of the largest diameters of the *pelvis*, were not as moveable as we find them to be, and could not diminish their breadth ; but, by means of these favourable dispositions, they accommodate themselves to the figure of the *pelvis*, and engage in it, by the efforts of the *uterus*, and of the auxiliary powers.

734. The head soon after presents at the same *strait* ; and in such a manner that the *occiput* is over the left *acetabulum*, and the face over the right *sacro-iliac symphysis*.

735. The chin, naturally resting on the breast, almost always engages before the *occiput*, so as to be very low by the time the latter reaches the edge of the *strait* ; which, detaining it a little longer, favours the descent of the former.

736. If the head engages diagonally in the superior *strait*, it does not fail soon to change its direction. It has scarcely cleared that *strait*, be-

fore it describes a rotatory motion, similar to that mentioned in par. 679; by means of which the forehead turns towards the middle of the *sacrum*, whose curve is better adapted to its round figure, and offers it a larger space. After this motion, the face lies along the *coccix* and *perinæum*; the nape of the neck being placed against the inferior edge of the *symphysis* of the *pubes*, behind which the *occiput* is in some measure concealed.

737. The chin being then very near the *vulva*, appears at the first or second pain: then follow the mouth, the nose, the forehead, the anterior *fontanelle*, and the *vertex*; all which pass successively before the *fourchette*, or anterior edge of the *perinæum*; while the nape of the neck only turns a little on the inferior edge of the *symphysis* of the *pubes*, as on its axis.

738. In this last period of labour, the action of the abdominal muscles, almost always subject to the will of the woman, and to the exertion of which she is then so powerfully excited, appears to be all that is necessary for the expulsion of the head; the contractions of the *uterus* assisting very little at that time. This remark ought to induce the woman to bear down with all her strength; and the accou-
cheur

cheur not to pull inconsiderately at the child's *trunk*, to finish the extraction of the head; as is too often done, in the mistaken and dangerous idea, that we cannot deliver the head too soon.

739. Though the child's arms, stopped by the elbows at the brim of the *pelvis*, rise towards the sides of the head; and, in proportion as the *trunk* and shoulders descend, become almost parallel to the neck—those parts are scarcely delivered, and the head advanced into the cavity of the *pelvis*, before the arms disengage of themselves.

740. By carefully observing the progress of the child in this first species of labour, we see with how much wisdom nature has directed all its motions—that the largest diameter of the breech, the shoulders, and the head, may not present parallel to the smallest diameters of the *pelvis*; and that the head, especially, may traverse that canal by offering it only the smallest of its two circumferences.

SECTION III.

Of the Mechanism of Natural Labour, where the Child presents the Feet in the Second Position.

741. WE cannot recollect the characters of the position of the feet which constitutes this species of labour, without remarking the same relation of dimensions between the *fœtus* and the *pelvis* of the mother, as in the preceding position, and without being convinced that the mechanism of the expulsion of the child must be the same in both cases.

742. In fact, the feet descend in this position as in the first; the breech traverses the *pelvis* in a diagonal direction; the shoulders engage in it in the same manner, and their breadth becomes afterwards parallel to the length of the *vulva*; the head presents its greatest extent according to one of the oblique diameters of the superior *strait*, but so that the *occiput* answers to the right *acetabulum*, and the face of the left *sacro-iliac* junction; as soon as the head has cleared the *strait*, the face turns towards the middle of the *sacrum*, and continues to advance along the curve of that bone, the *coccyx* and *perineum*;

næum; while the nape or back of the neck seems to turn on the inferior edge of the *symphysis* of the *pubes*, as on its axis.—See par. 737, and following.

S E C T I O N IV.

Of the Mechanism of Natural Labour, where the Child presents the Feet in the Third Position.

743. THE position of the feet which characterises this species of labour, has always passed for the most favourable of the four which I have assigned them: and will still appear so to those who only pay attention to the relation of the diameters of the breast and shoulders of the child to those of the superior *strait*; especially in those women who have the *pelvis* a little contracted from *pubes* to *sacrum*: but we shall think very differently, if we consider the relation of the dimensions of the head to that same *strait*.

744. The feet and trunk of the child may be delivered, in this species of labour, preserving their primitive position with respect to the woman;

man; that is to say, with the back turned directly towards the *pubes*. But it would be an error, when we see those parts descend thus, if we were to imagine that the head continues in the same position; that the face remains exactly underneath; and that the child's forehead passes before the *lumbar* column of the woman. The round form and mobility of the head demonstrate, at least, that it is difficult for it to descend in that manner, and pass over the angle formed by the union of the base of the *sacrum* with the last *lumbar vertebra*, as it descends into the *pelvis*.

745. Although the child's back sometimes disengages directly from under the *pubes*, experience proves that the forehead almost always turns away from the *lumbar* column, and places itself on one side of it; so that the head presents diagonally at the superior *strait*, as in the first or second position, to clear that *strait*, as well as the rest of the *pelvis*, in the manner described in par. 735 and following.

S E C T I O N V.

Of the Mechanism of Natural Labour, where the Child presents the Feet in the Fourth Position.

746. THE fourth position of the feet is generally regarded as the least favourable; because, the child's face coming upward, it was falsely imagined that the chin must be hitched on the edge of the *pubes*, and so obstruct the progress of the head. If facts have sometimes lent their support to this opinion, they have much oftener demonstrated that the fear of that accident was ill-founded, and that the precautions recommended to prevent it had only served to favour it.

747. It is however certain, that delivery is performed with somewhat more difficulty in this fourth position, than in the three others; because the face does not find the same space to disengage itself in from under the *pubes* in the latter period of labour, as it finds towards the *sacrum* in the other cases.

748. When we let nature act without constraint, and do not, under pretence of assisting her, perform any manœuvre capable of disturbing

turbing her course, the child's *trunk* generally changes its direction as it descends ; the breast turns from under the *pubes* ; and the breech, as well as the shoulders, engage obliquely in the openings of the *pelvis*, pretty nearly in the same manner as in the first positions of the feet.

749. Independently of these usual changes, the chin generally turns from over the *symphysis* of the *pubes*, before it reaches it ; because the *occiput*, on account of its roundness, and the extreme mobility of the head, cannot descend exactly along the middle of the convexity of the *lumbar* column, to stop and be fixed above the *sacro-vertebral* angle. If it does not place itself constantly on one of the sides of this column, at least it does so almost always ; so that the base of the *cranium* presents diagonally at the entrance of the *pelvis*, but so that the face answers to one of the *acetabula*, and the *occiput* to the *sacro-iliac symphysis* on the opposite side.

750. The head having placed itself thus, engages in the *pelvis*, and passes through it according to the same laws as in the three former species of this kind of labour. The forehead engages in the same manner before the *occiput* ; but instead of descending backward towards one of the *sacro-iliac symphyses*, and turning afterwards

wards towards the middle of the *sacrum*, it passes down behind one of the *acetabula*, to place itself presently under the arch of the *pubes*.

751. After this rotatory motion, the posterior part of the child's neck rests on the anterior edge of the *perinæum*, or the posterior part of the *vulva*; and that edge then becomes a kind of axis, on which the head turns backward as it disengages from the *pelvis*; in the same manner as it describes a quarter of a circle round the *symphysis* of the *pubes*, in the three former positions, but in a contrary direction.—See par. 737.

752. While the child's head describes this quarter of a circle backward, the posterior part of the neck turns more and more towards the *anus* of the woman; and we see the chin, the nose, the forehead, the *bregma*, and *vertex*, disengage successively from under the *pubes*. But the expulsion of the head is performed with much more difficulty than in those cases where the face is turned towards the *sacrum*; because the arch of the *pubes* is narrower, in its superior part, than the forehead and *vertex* of the child.

SECTION VI.

Remarks on those Labours where the Child presents the Feet.

753. We might have increased the positions for the feet as far as those for the crown of the head, and have established two more, on account of the particular positions which the head may take at the superior *strait*, when the breast descends behind the *pubes*; since the *occiput*, in turning away from the *lumbar* column of the mother, goes indifferently towards one or other of the *sacro-iliac symphyses*, and the face towards the *acetabulum* of the opposite side. But I thought it best to fix them to four principal ones; because the theory and mechanism of delivery, in all that might be remarked besides, will be found demonstrated in what I have said concerning those.

754. It is not necessary that the two feet of the child present together, for delivery to be performed without help; it only renders it a little easier: but it may be performed in the same manner when only one foot presents, provided the other extremity be so disposed as to extend towards the breast, in proportion as the first engages.

755. In all these cases, the *occiput* or the chin very rarely stops over the projection of the *sacrum*, so as to cause the length of the head to present parallel to the little diameter of the brim of the *pelvis*: but as this accident cannot happen without influencing the course of labour in an unfavourable manner, and generally requires the assistance of art, I shall reserve myself to treat in another place of what must be done, whether to prevent or remedy it.

A R T I C L E III.

Of the Third general Species of Natural Labour, or that in which the Child presents the Knees.

756. IF we call to mind the respective dimensions of the *fœtus* and the *pelvis* of the mother, and the mechanism of those labours which make the subject of the preceding article, it will not appear surprising that I reckon here, among natural labours, those where the child presents the knees; because it will be seen that it may be performed by the powers of the mother alone. If in the sequel I consider them otherwise, it is because there frequently occur circumstances

cumstances which render them preternatural; that is to say, impossible without assistance.

757. The child almost always offers but one knee to the orifice of the *uterus*; the other remaining placed, and as it were butted, against the margin of the *pelvis*, so as to obstruct delivery; or at least to render it very tedious and painful, unless we take care to prevent its difficulties.

758. It is not easy to know the knee by the touch, when it presents singly to the orifice of the *uterus*; because at first the finger can go over only so small an extent of it, that we cannot distinguish it from other parts: but it is not so when the two knees present together. The parallelism of two similar tumours sufficiently denote them in the latter case; so that we are not obliged, as in the former, to have recourse to signs, which are then beyond the reach of the finger, when the membranes are just opened.

759. It is sufficient for the understanding the mechanism of the different species of natural labour, where the child comes presenting the knees, to distinguish four principal positions, as we have done with respect to the feet; because all others we can meet with have a perfect resemblance to those.

760. In the first species, the child's legs, always bent when the knees engage in the *pelvis*, are towards the mother's left side, and the thighs towards the right.

761. In the second, the thighs answer to the left side of the *pelvis*, and the legs to the right.

762. In the third species, the anterior part of the thighs is turned towards the *sacrum* of the mother, and the legs are under the *pubes*.

763. We observe the contrary in the fourth species; the child's thighs being behind the *pubes* of the mother, and the legs placed against the *sacrum*.

764. In each of these cases, the situation of the child with respect to the *uterus* is absolutely the same as in the position of the preceding general species, indicated by the same numerical name. The mechanism of these two kinds of labour is also perfectly similar; for which the preceding article may be consulted.

A R T I C L E IV.

*Of the Fourth general Species of Natural Labour,
or that in which the Child presents the Breech.*

765. THE vulgar would cease to be astonished that so many women have been delivered without help, although the child presented the breech, or came double, according to the common expression, if they were better acquainted with the proportion between the dimensions of that part, and those of the mother's *pelvis*; and considered that the child's breech, being soft, will yield to pressure, and mould itself, in some measure, to the form of the cavity through which it must pass. The knowledge of these principles would have prevented some practitioners from seeking, in these very labours, an argument in favour of their opinion on the separation of the *ossa pubis*.

766. Delivery may in general be performed as naturally when the child presents the breech, as when it offers the feet or knees; only that, *cæteris paribus*, it will be a little longer and more difficult; because the child does not then form so regular and lengthened a wedge,

wedge, as when the inferior extremities are unfolded.

767. A pretty large tumour, in which we discover neither the hardness of the head, nor the softness of the belly, is the first sign of the presence of the breech. A deep furrow, in which we find the *anus* and the parts of generation, puts us out of doubt. The discharge of the *meconium*, as soon as the membranes are opened, may make us presume that the child presents the breech; but we cannot be certain of it without the signs above stated.

768. Though it is almost always difficult to distinguish this part perfectly before the opening of the membranes, it is almost impossible to mistake it afterwards; and not to discover also its situation with respect to the *pelvis*, with the greatest precision.

769. We might multiply the positions which the child's breech may take at the orifice of the *uterus*, beyond what we have done for the feet and knees; but I shall distinguish only four principal ones, as I have done for them.

SECTION I.

Of the Mechanism of Natural Labour, where the Child presents the Breech in the First Position.

770. IN this species of labour, the breech presents at the entrance of the *pelvis* ; so that the child's back is towards the mother's left side, and a little forward. But, in proportion as it descends, its greatest breadth becomes parallel to the *antero-posterior* diameter of the inferior *strait* ; the left hip placing itself a little obliquely under the *pubes*, and the right before the *sacrum*. The right hip at first makes more way than the other, continuing to advance along the slope of the *sacrum*, *coccyx*, and *perineum* ; while the left only turns on the inferior edge of the *symphysis* of the *pubes*, as I have observed before with respect to the *occiput*.— See par. 683.

771. We first see the right hip appear at the *vulva* ; and afterwards the breech disengages, rising a little towards the *mons veneris* ; and the child's trunk, as it is delivered, bends a little in the same direction. When the breech is sufficiently descended, the feet, which were extended

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ed towards the child's breast, disengage of themselves; and the rest of the labour goes on as in the first position of the feet.—See par. 732, and following.

S E C T I O N II.

Of the Mechanism of Natural Labour, where the Child presents the Breech in the Second Position.

772. IN the second position of the breech, its greatest breadth is also parallel to one of the oblique diameters of the entrance of the *pelvis*; but so that the child's back is towards the right side of the *uterus*, and a little forward. The breech engages by the same mechanism as in the first position, and advances in the same manner; except that the right hip, instead of the left, places itself under the arch of the *pubes*. The left hip being turned towards the *sacrum*, continues to descend along the curve of that bone and the *perinæum*, while the right hip only turns a little under the *symphysis* of the *pubes*. The child's trunk disengages, bending lightly towards the *pubes*; and when the feet are without,

out, every thing goes on as if they had presented in the second position.—See par. 742.

S E C T I O N III.

Of the Mechanism of Natural Labour, where the Child presents the Breech in the Third and Fourth Positions.

773. IN the third species of labour, where the child presents the breech, it is placed so that the back is upward, and the belly downward. It is seldom that it descends in that position; and more seldom still that the forehead does not afterwards turn away from the projection formed by the base of the *sacrum*; which makes the head present diagonally at the superior *strait*, and place itself as in those labours where the feet present in the first or second position.

774. Things go on nearly in the same manner in the fourth position of the breech, where the child's belly is upwards, and the back towards the posterior part of the *uterus*. If its breadth, from one hip to the other, is at first placed transversely, with respect to the superior *strait*,

strait, it becomes insensibly parallel to one of its oblique diameters, and afterwards to the largest diameter of the inferior *strait*; so that the length of the head presents in the same manner to both: but with this difference, however, that the *occiput* is underneath, and the face answers to one of the *acetabula*; whereas in the former positions the face is underneath, and the *occiput* towards one of the *acetabula*.

775. The third and fourth positions of the breech are much more rare than the others; and the fourth is still more so than the third. The third has been regarded by most accoucheurs as the most common and the best; but it is very far from being so. The fourth has always been looked on as the least favourable; because, the child's belly being upward, it was thought the chin might hitch on the *pubes*, as was likewise supposed in the position of the feet which answers to this. In both these positions of the breech, if it does not in its descent undergo the changes stated in par. 773 and 774, its delivery cannot but be, in general, very painful and laborious.

C H A P. III.

Of the Management of the Woman during Labour.

776. **T**HE greater part of women, if left entirely to themselves during labour, would nevertheless be delivered without help : this truth, founded in nature, has no need of new proofs. But those same women, if assisted seasonably, would they not be delivered with more ease and safety ? That is what I shall now proceed to investigate.

777. Among those labours which are terminated without help, some take place so precipitately, that the great and sudden depletion of the *uterus* sometimes becomes the source of several mortal accidents, or at least extremely dangerous ; and others are so tedious and laborious, that their consequences are not less dreadful : whence we see that it may be as salutary to check the progress of the former, as to accelerate that of the latter.

778. Though nature would, sooner or later, surmount some of the obstacles to delivery,

there are many others under which the woman would infallibly sink, if we were not to come to her assistance.

779. The accoucheur ought then, in none of these cases, to content himself with being a mere spectator. That patience, which is recommended by some as his principal virtue, ought to have its limits; an excess of confidence in the secret resources of nature, which some people boast of with a sort of assurance, being not less condemnable than the inconsiderate manœuvres of those ignorant men, in whom rashness supplies the place of knowledge.

S E C T I O N I.

Of the Treatment which the State of the Woman generally requires in the First Period of Labour.

780. WOMEN, almost always uncertain concerning the period of their pregnancy, often mistake for the beginning of labour, pains which are very foreign to it; but whose progress is sometimes such, that women who
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have had several children, may be deceived by them.

781. The accoucheur, after having observed the effect of these pains a little while, ought to endeavour to distinguish their true character, and discover their cause; in order to favour the true labour pains, or administer proper remedies for those which are foreign to it, lest they should bring it on prematurely, as frequently happens.

782. Touching alone can enable us to distinguish these two species of pains with certainty; for they are sometimes extremely similar in their manner of attack, and their progress; but always very different in their causes.

783. A hardness of the uterine globe, a stiffness of the edge of its orifice, and a distention of the membranes during the pain, as well as a slackness and relaxation of all those parts in proportion as it goes off, invariably characterize the pains of labour; because, like them, those symptoms are inseparable from a contraction of the *uterus*.

784. The effects of false pains are on the contrary very various, both on account of the diversity of their causes, their complication, and the parts which are the seat of them. Some-

times these pains are caused by a plethora, either universal or partial; sometimes by indigested or putrid matter in the first passages; by a stone in the kidneys, ureters, or in the bladder; and sometimes from several of these causes together. We never observe any of the effects mentioned in the preceding paragraph, during the action of these false pains, at least unless they have excited contractions of the *uterus*, and true labour pains.

785. After having perfectly recognised the character of the true pains, whose frequent return, and augmentation, constitute what is usually called labour; the accoucheur must endeavour to discover whether the woman be at her full time or not; that he may not forward an accidental labour, which he might have put off, if he had sought its true cause. In order to which, he must recal to mind the characteristic signs of the different periods of pregnancy.—See the article on touching.

786. When these pains are not felt till the time of the perfect maturity of the *fœtus*, we must attend to their frequency and intensity; to the size of the orifice of the *uterus*, and to the hardness of its edge; in order to estimate nearly what will be the duration of the labour, and
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the time when it will terminate. We must not forget, in order to form a just prognostic, that the first labour is in general longer than others, and that the dilatation of the orifice of the *uterus* is never slower than at the beginning of labour.—See par. 618.

787. We ought also to inform ourselves, by touching, whether the *pelvis* be well formed or not, especially in a first labour; and how the orifice of the *uterus* is situated, and whether the *fundus* is oblique, as well as what part of the child presents, and its position; in order to prescribe early that situation which is best adapted to the state of the woman.

788. All women should not be treated in the same manner during the course of labour, because the circumstances of it may be different; what is useful to some, may be pernicious to others. We ought not, for example, to give any thing but broth to those whose labour is strong, or ready to terminate, if they stand in need of any aliment; but we may allow more solid nourishment to those whose labour is but beginning, especially if it be not likely to terminate soon, in order to support their strength.

789. We ought not to be less cautious concerning the drink we allow to a woman in la-

bour, than about the nature of her aliment. All heating things, such as wine mulled with spices, or spirituous liquors, so much in use among the common people, are to be avoided, except by some few, who may have need of a cordial. The most convenient drinks are barley-water, gruel, weak lemonade, or any other diluting liquor. Many women prefer wine and water; but it is apt to produce acidities, and often provokes vomiting, to which there is already but too much disposition, especially when it is drunk hot.

790. Glysters should not be neglected: one is sufficient to evacuate the gross excrements which might add something to the natural difficulties of labour; but it will be necessary to repeat them when the labour is tedious, when the pains are felt towards the loins, and when there is any heat in the bowels. A decoction of some emollient plant, or of linseed, is preferable to plain water.

791. Bleeding at the arm is not less useful in many cases. By diminishing the plethora in some women, it augments the force and energy of the contractions of the *uterus*, while it mollifies and relaxes the soft parts which form the passage. It is particularly salutary to those women who complain

complain of pains in the head, and a sensation of heaviness in the limbs; to those who have the eyes red, the face inflamed, the superficial vessels puffed up; or who are threatened with convulsions, hæmorrhage, inflammation of the *uterus*, &c.

792. Baths, demi-baths, emollient fomentations, and moist fumigations, may be employed with success. These means are never more useful than when time has taken from the parts concerned in delivery, the natural suppleness of youth, so necessary for a facility in this operation. But we must by no means have recourse to them, and especially to the warm bath, when a sanguine plethora predominates, till we have first diminished it by one or two bleedings. For so much as they are beneficial in some circumstances, so much they become pernicious in this latter, whether to the mother, or to the child.

S E C T I O N II.

Of the Situation of the Woman during Labour.

793. THE situation of the woman is not always arbitrary: it must be varied according to

circumstances, and the period of labour. When it is but just begun, and is not complicated with any accident, and every thing relative to delivery is in good order, the woman may chuse the situation which appears most convenient to herself.

794. Women threatened with a descent of the *uterus*, or an hæmorrhage; those who are very weak, or in whom the *uterus* is situated obliquely—ought to lie down from the beginning of labour to the end. In cases of great forward obliquity, they must be laid on the back; in lateral obliquities, on one side, but on that which is opposite to the deviation, in order to bring the axis of the *uterus* nearly parallel to that of the *pelvis*.

795. Although the situation in which women are usually placed, in the last period of labour, is often not less important than that at the beginning, yet it is not the same in all nations. Reason, and convenience to the women, are almost always less consulted than custom. In some countries, as in Flanders, Holland, Spain, &c. the women have chairs made on purpose. Almost all over England, they place themselves on a bed, and lie on their side, with the breech turned towards the accoucheur; the legs and thighs being

ing half bent, and their knees separated by a pillow.

796. In some of our provinces the women are delivered kneeling on a cushion, with the elbows resting on a chair: in others they keep themselves standing, or sit on the knees of some person who supports them. But of all these positions, none is more convenient than that adopted among us. *Roëderer* confesses that the best chairs are much less convenient than the little bed used in France*. This bed is constructed in the following manner:

797. If we have not the common bedstead of the breadth of from two feet and an half to three feet at most, and covered with its straw matrafs, we take a *lit de sangles* †, on which we smoothly lay one or two matraffes. Under the middle of them we put a cushion of hair, or straw, to keep them from sinking, and to support the woman's

* *Roëderer* practised midwifery in a nation where the chair was very much in fashion.

† *Lit de sangles* is a little bedstead without any transverse pieces at the ends; the feet of which cross each other at their centers, and are pinned together; so that, when the bed is off, the sides of the bedstead may be brought close to each other, and the feet are then almost parallel. It is a kind of bedstead in frequent use among the poorer people and servants in Paris.

loins. This bed is to be furnished with pillows and sheets, and blankets according to the season.

798. But it is better to double the uppermost matras, so that it may cover but one half of the length of the bedstead, than to spread it over the whole: as the woman may then be placed on it much more commodiously for delivery. In the former case they are laid flat, with the breech often sunk into the bed, notwithstanding the precaution of the cushion; so that the *perinæum* and *vulva* are hid. In the latter, the lower part of the *trunk* being placed on the end of the folded matras, all those parts are entirely free, and are much more easily developed: the woman is not obliged, as in the former case, to raise the breech, resting on the heels and shoulders, at every pain, till the child be expelled.

799. It is customary to place a cross board at the foot of this bed, to sustain the woman's feet in time of a pain, and favour her efforts: but this precaution is useless, as we always find more hands than we want, to give the woman every necessary support.

SECTION III.

Of preparing the Parts of the Woman for Delivery.

800. Most midwives are still in the pernicious habit of placing the woman on the bed as soon as the pains are a little frequent and strong, in order to begin betimes what they call the *preparation*; or, to speak more intelligibly, the dilatation of the parts. This they often do without knowing whether the woman be in labour or not, and sometimes even without being sure that she is with child; which indeed I should scarcely believe, if I had not been several times a witness of it.

801. These manœuvres, which they intitle preparatory dilatations, often produce an effect quite contrary to what they expect from them: for by depriving the parts, which they handle so incautiously, of the *mucus* which nature furnishes at that time abundantly, for no other purpose but to relax them, they irritate and dry them so much, that they seldom fail to inflame and become extremely painful.

802. It is sometimes necessary to prepare these parts for delivery, and even to begin those preparations during the latter periods of pregnancy;

nancy ; but then we must proceed in a very different manner. Warm baths, or demi-baths, emollient vapours, and the repeated application of fat or mucilaginous substances, may be advantageously employed. Emollient injections, such as the mucilage of marsh-mallows, or of linseed, would not be less useful ; but there is something so disgusting in them, that few women will submit to their use, except in accidental circumstances which are more severe than those that accompany a labour which is merely long and laborious.

803. I do not proscribe all dilatations performed by the introduction of the fingers ; because there are cases where they are useful, and even necessary, whether in respect to the orifice of the *uterus*, or only the external parts : they must then sometimes be made, but at a proper time, and in a proper manner,

804. These same preparations, if we give credit to the blind credulity of some accoucheurs, are not to be confined to the soft parts, but should extend to the *pelvis* itself. In fact, have they not flattered themselves that they might augment the size of that species of canal, by relaxing the *symphyses* of the bones which compose it, and procuring a separation of them ?

But

But such reveries can never turn to the advantage of the art.

805. The retropulsion of the *coccix*, recommended by so many accoucheurs, in order to favour the passage of the child's head, would be one of those preparatory dilatations which ought not to be neglected, if the *coccix* formed as great and frequent an obstacle to delivery as has been supposed; but those obstacles attributed to the *coccix*, generally proceed only from the rigidity of the external soft parts.—See par. 105.

S E C T I O N IV.

Of quickening Lingerin Pains.

806. NOTHING is less regular than the progress of labour pains: sometimes they augment suddenly; sometimes they diminish, slacken, and even go entirely off for a time; which may depend on a variety of causes, each of which presents a particular indication.

807. Many persons, without regard to those different indications, always prescribe irritating remedies, in order to quicken the pains. Some
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give decoction of fenna in glysters, others in draughts; and *Mauriceau* added to this beverage the juice of a four orange. Others again prescribe ipecacoanha, to excite vomiting; and some to keep the woman standing or walking about, which is quite as imprudent: for there is as much ignorance in dragging the woman thus about the chamber, when she is worn out with fatigue, as in tormenting her with active medicines. Time is almost always the best remedy in these cases.

808. When the lingering of labour proceeds only from the weakness or exhaustion of the woman, rest, good restoratives, a little wine, or other things of that kind, will be found most beneficial. On the contrary, when it depends on a stiffness of the fibres of the *uterus*, on an *engorgement*, or inflammation of that *viscus*, bleeding, warm baths, emollient fomentations, and diluting drinks, are the only things capable of quickening the pains. But if the slowness of the labour is only the effect of the premature or continual draining off of the waters, as has been already mentioned, we must wait till they be completely evacuated; or else accelerate their issue by tearing the membranes anew in a more favourable part, and raising the child's head a lit-

tle with the end of the finger; which may be easily done, and without the smallest inconvenience, notwithstanding the fears which some have endeavoured to excite concerning the consequences of this procedure.

SECTION V.

Of opening the Membranes.

809. THOUGH the premature opening of the membranes often renders labour more tedious, and in some respects more laborious; the same inconveniences sometimes also arise from their not opening in proper time: whence we see that it would not be less useful to open them in the latter case, than to keep them whole in the former, if we could.

810. Except in cases of flooding, or convulsions *, we ought never to open the membranes before the orifice of the *uterus* be entirely prepared for delivery; that is to say, till it be larger than a crown piece, and its edge so soft and thin, that it may be easily extended farther. The labour ought moreover to be in its full

* See par. 1089 and 1111.

force ; which supposes the pains to be strong and frequent.

811. The manner of opening the membranes is in general very simple. We advance the end of the finger to the middle of the orifice of the *uterus*, and wait till the membranes are forced through it, and become very tense, which can only be during a pain ; by pushing the finger then, it passes through them. If we do not succeed the first time, we must wait for another pain, and try again.

812. This method does not always succeed : either because the membranes are of a very strong or of a very loose texture ; or because their thickest and most cellular part is nearest the finger ; or because the child's head is already so engaged, that the waters cannot pass under it, to distend the bag sufficiently.

813. When the membranes present their thickest part at the orifice of the *uterus*, or are so strong that we cannot tear them by the method recommended above, we must begin by weakening them in one point, by scratching them with the end of the nail ; and afterwards we may succeed more easily. If this also fail, we may open them with the point of a pair of common scissars, which may be introduced covered

vered with a little ball of wax, if necessary, in order to conduct them more safely. I must remark that this case is exceedingly rare; and still more rare, when it does happen, for the pouch formed by the membranes not to be near enough to the *vulva* to be seen, and consequently opened without fear: so that we may dispense with the aforesaid precaution.

814. When the pouch remains very slack during the pain, either because the membranes are of a very soft and loose texture, or because the head, being very low, hinders the waters from descending sufficiently to fill and distend it, it must be torn by pinching the membranes between the ends of two fingers.

815. Whether we use the finger only in opening the pouch, by scratching the membranes to weaken them, or otherwise; or whether we use scissars, or any other instrument; we ought to take great care not to act upon the child's head, by mistaking a tumour of the hairy scalp, which frequently rises in laborious cases, for the pouch in question. We must, with the same care, avoid applying an instrument, or the nail, to the *uterus*, which sometimes still covers the head, though it is very low in the *pelvis*. It is so much the more easy for persons not exceedingly

ingly skilful to be deceived in this latter case, because the orifice of the *uterus* is concealed backward ; and that portion of it which covers the child's head, becomes at length, and especially during the pain, as smooth and as tense as the membranes.—See par. 298, and the observations relating to it.

S E C T I O N VI.

Of what is necessary to be done after the Membranes are open.

816. THE woman can never be examined by touching more seasonably than immediately after the opening of the membranes : whether to certify ourselves concerning the position of the child, if we have not been able to discover it before ; or to observe whether the head engages in a favourable manner, or not : in order to let nature act, or prevent her being exposed to fruitless efforts, according to circumstances.

817. As it is necessary to excite some women to bear down with all their strength, to accelerate their delivery ; so it is not less advantageous

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to engage those who are subject to a descent of the *uterus*, an *hernia*, spitting of blood, &c. to moderate those same efforts.

818. To hinder the descent of the *uterus*, when there is any reason to fear it, it is not sufficient merely to engage the woman not to bear down: the accoucheur must likewise support the edge of the orifice of the *uterus* during each pain, that it may not be pushed out by the child's head; which is apt to happen when the edge is rigid. We must likewise be careful not to suffer it to be dragged along by the shoulders, in delivering the *trunk*.

819. When there is an hernial tumour, we must endeavour to reduce it; and prevent its return by a convenient pressure, either with the ends of the fingers, or a suitable compress. It were to be wished that we could exert a like pressure when the hernia cannot be reduced, to prevent a new portion of intestine from insinuating itself into the tumour, and endangering a strangulation: as I saw in a woman who had had a large *epioplomphalocèle* nine years, and who for two days had in vain exerted the most violent efforts for delivery.

820. When the woman is much troubled with pains in the small of the back, a folded napkin

may be passed under the loins, with which two assistants may raise her up, and support that part during each pain. This precaution, besides that it diminishes the intensity of those pains, is often necessary in the last moments of labour, to favour the exit of the child. Indeed it can hardly be dispensed with in those women who are laid flat, who have the breech sunk and hid in the bed, and who want strength or courage to raise it up during the last pains, by supporting themselves on the heels and shoulders.

821. When the woman is attacked by the cramp in the legs and thighs, which is often less supportable than the most violent labour pains, we must endeavour to relieve her, either by dry frictions on the part affected, or otherwise, according to circumstances; and by changing the direction of the child's head a little with respect to the *sacral* nerves, which it always compresses more on one side than the other.

822. When the child's head begins to press against the external parts, it is sometimes proper to prepare them, that they may not be injured in the last moments. Besides fat substances, such as lard, &c. which we are to apply often, we may introduce two fingers into the *vagina*, to enlarge it by degrees, as well as the *vulva*, either
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by separating the fingers in different directions successively, or by pressing downward against the *perinæum*. But this is only to be done in the interval of the pains; contenting ourselves, during their action, with supporting the *perinæum* with the palm of the hand, in order to prevent its tearing, and hinder the head from being delivered too suddenly.

823. These preparations are never more necessary than in a first labour. If they are omitted then, we are commonly freed from the necessity of using them afterwards; because the *perinæum* being torn, never unites perfectly, nor do the other parts ever recover their natural tone.

824. When the posterior extremity of the head is engaged in the *vulva*, as in a kind of crown, if the *fourchette* is not too much distended, we may permit the woman to indulge her inclination to bear down; and during that time, without however discontinuing to support the *perinæum*, we may favour the exit of the head, by pressing against it underneath, and near the *anus* of the woman, as it were to oblige it to ascend towards the *mons veneris*.

825. The vulgar think that at this time the accoucheur takes the child by the ears to pull it

towards him. If it is ridiculous to believe it, it would be much more so to propose it, as has been done on another occasion. It would not answer any better to attempt to insinuate the hands on each side the head, in order to grasp it; or to introduce the fingers into the *anus* of the woman, to press it from behind forward, and force it out.

826. The head being almost delivered, we finish its disengagement by raising it more and more towards the *pubes*; or by insinuating one of the fore fingers under one of the sides of the lower jaw. We then turn the face towards one of the woman's thighs, but observing that it be towards that to which it tends of itself. Afterwards we examine the situation of the shoulders with respect to the inferior *strait*: and push one of them towards the *sacrum*, and bring the other under the *pubes*, if they are not placed so naturally. We then deliver them, as well as the rest of the body, by pulling gently and cautiously at the head; while the mother, on her side, does what she can to expel it.

827. We must never attempt to pull with any considerable force at the head and neck of the child, with a view to extract the *trunk*, when the breadth of the shoulders obstructs its progress; for

for nothing can be more dangerous than such efforts. In that case, we must introduce the fore finger of each hand into the *axilla*, in order to pull with them, after the manner of hooks; and, if that be not sufficient, we apply *lacs*, or the blunt hooks which terminate the handles of the French forceps, or some other similar instrument: but these cases are so extraordinary, that an accoucheur in great practice, and properly skilled, would not perhaps meet with it four times in his life.

828. When the shoulders do not come along easily, we must always begin by making them take the situation above mentioned; for even the smallest cannot be delivered transversely without extreme difficulty; as is very easy to comprehend.

S E C T I O N VII.

Particular Precautions relative to each Position of the Head, or to other Circumstances which sometimes render Natural Labour a little more difficult.

829. CIRCUMSTANCES, which would be too long to detail here, may add to the natural dif-

difficulties of labour, by obstructing more or less the pivot-like motion, by which the *occiput* or forehead place themselves opposite to the arch of the *pubes*, when the head has engaged diagonally in the cavity of the *pelvis*. We may then prevent some difficulties to the woman, by seasonably favouring this rotatory motion; and may often shorten the work of nature considerably, supposing her able to accomplish it.

830. When the head presents in the third position, which is not very frequent, if the brim of the *pelvis* is a little narrow from *pubis* to *sacrum*, we ought to advance the hand, or some of the fingers only, to the entrance of the *uterus*, to turn away the *occiput* from over the *symphysis* of the *pubes*, and direct it towards one of the *acetabula*: which is generally pretty easily executed at the time of the opening of the membranes. This precaution may spare the woman the pains of a much longer labour than when the head presents in the first or second position; and which, after all, might sometimes be fruitless.

831. In the fourth and fifth positions of the head, we ought also to endeavour to bring the *occiput* towards one of the *acetabula*; that it may afterwards turn under the arch of the *pubes*, instead of going towards the curve of the *sacrum*.

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By thus directing the back of the head, in proportion as it engages in either of these positions, we often only favour the efforts of nature, which tend to make it take that course: but sometimes also we, as it were, prescribe laws to her; and the facility of the delivery is the work of art.

832. It were to be wished that we could in the same manner change the sixth position of the head, and reduce it to one of the two first; but we must not hope to accomplish that, even if we pass the hand into the *uterus* at the instant of opening the membranes; on account of the difficulty of making the child's body turn in the same direction as the head: still less can we do it when the waters have been a long time evacuated, and the head is already in the cavity of the *pelvis*: we could not at this time carry the face downward, but by making it pass round half the circumference of the *pelvis*; and that motion, which would be entirely at the expence of the neck, the *trunk* being fixed, and closely embraced by the *uterus*, would be of the most dangerous consequence to the child.

833. In the best positions, as well as in the others, the head sometimes engages in such a manner, that the forehead descends more than the *occiput*, so that the head presents the whole

length of its greatest diameter to the inferior *strait*; which generally produces insurmountable obstacles to its exit. It is easy to prevent these obstacles, by changing the situation of the *uterus* betimes, and by supporting the fore part of the head a little, to oblige the *occiput* to descend. I shall treat more amply in the sequel of what must be done in this circumstance.—See par. 1278 to par. 1287 inclusively.

834. It is very common to see a child come with the umbilical cord twisted round its neck; and this disposition, though it does not produce those obstacles to the exit of the head, which have been commonly attributed to it, yet requires some precautions on the part of the accoucheur: but they do not become necessary till the head is without; that, in disengaging the *trunk*, the *umbilicus*, already stretched, may not be torn, nor the *placenta* dragged along at the same time.

835. Some authors have recommended, in order to avoid tearing the *umbilicus*, as well as to facilitate the delivery of the *trunk*, and hinder the *placenta* from being dragged along with it, to untwist the cord, by making it pass as many times over the head as there are turns on the neck; or else to keep the head on one side
against

against the *vulva*, and deliver the *trunk* by bending it as it comes along. But if we find any difficulty in obeying these precepts, we must cut the cord, and especially when the child's face is swelled, or livid, in order to prevent the effects of a longer strangulation.

836. I shall in the sequel detail the particular indications presented by the other species of natural labour; as well as the various circumstances which, by complicating them, often render them preternatural.

C H A P. IV.

Of the Management of the new-born Child.

837. **T**HE child must be treated differently, according to its state and condition at the time of birth.

S E C T I O N I.

Of the usual Method of treating a new-born healthy Child.

838. As soon as the child is born, we lay it transversely, between its mother's legs, and so near to her that the cord may not be stretched; and then turn it on one of its sides, that the blood and waters which drain from the *uterus* may not fall into its mouth.

839. Some accoucheurs are accustomed to leave the child in that state several minutes, and even longer, without meddling with the cord; only taking care to lift up the coverings a little, that it may breathe: while many others scarcely
 7 give

give themselves time to tie and cut the cord, before they remove it from its mother.

840. In fact, we ought to leave it as short a time as possible under the clothes ; because there it can only respire a moist and impure air, always too much rarefied, and often infected with animal vapours which rise from excrements and urine which the woman discharges involuntarily in the last moments of labour ; very different from that pure and temperate air, which its delicate organs require.

841. The custom of making two ligatures on the cord, seems to be as ancient as the art itself. The fear of a dangerous hæmorrhage, from having seen a few drops of blood distil from the divided vessels, rather than any real hæmorrhage, seems to have established it. One could not even now speak against this custom, without a risk of being accused of ignorance and unskilfulness ; so much has it been respected in all ages.

842. These ligatures do not however seem essentially necessary, when things are in the natural order ; and we may venture to affirm, in fact, that they are not so, since the vessels of the cord, cut a few inches from the *umbilicus*, discharge from both ends but half an ounce or
an

an ounce of blood, at the most, and often less, and then it stops of itself. These ligatures are not only useless in the first moments, but may also become hurtful.

843. That which is made on the portion of the cord next the *umbilicus*, always injurious to plethoric children, whose birth, more or less laborious, has occasioned sanguine congestions in the principal *viscera*, is much more so to those who are born in a state of apoplexy, with the face swelled and livid, and with universal marks of excessive repletion; for it seldom fails to confirm their fate, by opposing the evacuation which it is then so important to procure by the cord.

844. This same ligature, dangerous in those circumstances, and, besides, always useless in the first moments, may become very necessary afterwards; for some children have perished by an hæmorrhage from the umbilical cord, the ligature on which had been badly made; and others have been extremely weakened by a loss of blood which has happened one or two days after their birth. Since the blood may retake its course in the umbilical vessels, though it had ceased to flow in them for some minutes, and even hours, or longer; and we cannot remove
every

every thing from children which might determine it to take its former route, we ought to tie the umbilical cord, and do it carefully.

845. To make this ligature, we take five or six threads together ; and make a circular round the cord, which we tie with a single knot ; then a second and third turn, and fix them with two knots : taking care that the ligature be tight enough to resist the impulse of the blood, in case of need. When the cord is fat, and, as it were, œdematous, it is better to make two ligatures, at five or six lines distance, than one ; because the first, though apparently very tight, does not always obliterate the vessels, and may be very slack when the cellular tissue of the cord comes to shrink : which would permit the blood to pass freely under it, if any cause should determine it anew towards that part.

846. Some accoucheurs have recommended, before we tie the cord, to express the little blood it contains, as well as a part of that yellowish and mucous humour, of which the cellular tissue is full ; a futile precaution, but what many people oblige us to do, because they have been taught to believe that the seeds of many diseases exist in that humour, or arise from the corruption of the small quantity of blood which
may

may be thus expressed from the umbilical vessels.

847. It is the custom to tie the cord at about two inches from the *umbilicus* : we must comply with that custom, because the vulgar imagine that the navel is sunk deeper, or projects farther, according as the ligature has been made nearer or farther from the belly, and that the child therefore becomes more or less exposed to an umbilical hernia ; though the accoucheur ought to think differently. The cord never falls off at the part tied, but always at the circle formed by the *epidermis*, or skin of the child, though we cannot clearly account for it. The *cicatrix* of the *umbilicus* is more salient, or sunk, according as the teguments of the child advance more or less on the cord : but the disposition to hernia is foreign to all these things ; it depends on the natural weakness of the ring, and on the little care taken to support that part in the first months after birth.

848. The ligature which is intended to prevent the flow of blood from the mother, by the umbilical vein, is not only useless, as has been already said ; but, by opposing the depletion of the *placenta*, it may in many cases render the delivery of it a little more difficult. We ought
never

never to make it, because it is not essentially necessary in any case: that is the practice I have always followed, and taught; and Smellie knew and declared all the advantages of it a long time before.

849. This ligature would not have been more advantageous in those women, who, according to some authors, have lost several quarts of blood by the umbilical vein, and as I believe may happen. The ligature, in those cases, by opposing the flow of blood from the umbilical vein, would occasion an *engorgement* of the whole system of the *placenta*, an extraordinary swelling of its mass, and its detachment from the *uterus*; and consequently a flooding, whose violence would be proportioned to the atony which then affects the *uterus*. The inactivity of the *uterus* in those cases presented a very different indication: that *viscus* ought to have been made to contract, and the torpor of its fibres dissipated; the hæmorrhage would then have stopped without a ligature, in the same manner as a flooding ceases after delivering the after-birth, in proportion as the *uterus* lessens its bulk. Experience has many times proved to me the truth of this assertion, and enabled me to display it in the clearest light to the eyes of my pupils.

SECTION II.

Of the Treatment of a Child born in a Morbid State.

850. SOME children are born in a state of apoplexy; others in a state of *asphyxy*, or apparently dead; and some come so weak, that we scarcely dare flatter ourselves we shall be able to revive them.

851. The section of the cord, on account of the depletion it procures, is the most efficacious assistance we can give to those born in a state of apoplexy; and it would not be less dangerous, to those children, to leave the cord whole than to tie it.

852. The vital powers are sometimes so weakened in these cases, that it is with difficulty we obtain a few drops of blood by the section of the umbilical cord; which cannot be sufficient to save the life of the child. We must then endeavour to procure a greater discharge by pressing the belly gently, and alternately. We often cannot obtain the discharge necessary to unload the vessels of the brain, and make the tumefaction and lividity of the face disappear,
without

without plunging the child up to the arm-pits into a bath more than warm, and rendered stimulant by the addition of some spirituous liquor, as wine, brandy, or even vinegar.

853. By this means we awaken the irritability of the heart, ready to be extinguished, excite its contractions, and quicken them so far, that we soon see its pulsations re-appear, those of the arteries of the cord, and of the *carotids*, though they had ceased for some minutes; and the blood which fell by drops from the umbilical arteries, presently flows by starts, and to a considerable distance. I have observed all these effects in children who were born in a state of the most complete *asphyxy*, and had been already abandoned as dead, after a few fruitless attempts. One of these children gave but very uncertain signs of life half an hour after its birth, and did not shew any positive ones till more than an hour; for we cannot regard as such, the oscillations excited by the heat and activity of the bath *.

854. Having brought these children into a free and temperate air, whether we keep them

* I have collected some very interesting observations on this subject, which cannot have a place here, on account of the limits which I have prescribed myself.

in the bath I have just prescribed, or not, as may be thought proper, their mouths must be cleansed from the slime which often fills them; and then we procure them a kind of artificial respiration, by blowing repeatedly into their mouths while we close the nostrils with the finger and thumb, and as often pressing their breasts, but very cautiously. We may also irritate the membrane of the nose with a feather, or bring a little volatile alkali near it; or rub the regions of the temples, spine, and heart, with cloths dipped in some spirituous liquor.

855. These latter means must be used still more liberally to children born pale and discoloured, with the limbs flaccid, and who appear to be in that middle state between life and death, known by the name of *asphyxy*, than to those in an apoplexy.

856. Dry frictions with hot cloths, on the whole length of the spine, and the blowing the smoak of paper into the *anus*, must not be neglected. Brushing the soles of the feet, the palms of the hands, and the back, swiftly, but lightly, with a flesh brush, is perhaps the most efficacious means of awakening the principle of life in this sort of children. We may advantageously pour one or two drops of volatile al-

kali,

kali, mixed with a tea-spoonful of water, into their mouths. If that cannot be got, we may put a bruised onion or garlick under their nose.

857. Some children, to whom these means had been administered too sparingly, or who perhaps had been deprived of them because they were thought dead, have been taken alive several hours afterwards from under the clothes, where they had been already, as it were, buried; which makes it probable that many others might have been saved, had the proper means been diligently used.

858. It is generally thought necessary to keep children, born so weak as to give little hope of living, some time close to the mother, and without cutting the umbilical cord. This precaution is not only useless, but may be hurtful to the child. The circulation of the blood from the vessels of the *uterus*, into those of the *placenta*, and *vice versa*, no longer going on, and that in the cord being almost extinguished, the child cannot be revived by the mother, as some have thought. She can communicate but very little heat to it, which may be much more easily and certainly procured another way: the child, by this pretended help, is deprived of that

which would be more real and efficacious, and which cannot be administered till it be removed from the mother.

859. As soon as the pulsation ceases in the cord, it ought to be cut: the ligature is at that instant useless, because there is no blood flows. After taking the child from under the clothes, it must be kept warm, and treated as directed in par. 852 and following. We may also bathe it in warm water, mixed with wine; but it must never be plunged into brandy alone, or into strong wines, &c. I have seen children who have narrowly escaped being victims to the credulity of their parents concerning the virtues of these baths: some have been threatened with convulsions; and others have been taken out with the face tumefied and livid, and as in a state of apoplexy. I saw one whose whole body was covered with little red spots like flea-bites, the greater part of which ulcerated the next day: it lived eight days in that state.

860. After natural labours which have been difficult and very long, whether on account of the narrowness of the *straits* of the *pelvis*, or the resistance of the soft parts, children are born with a tumour more or less voluminous, and commonly

commonly pretty soft, on the top of the head and a little backward; the *cranium* itself is lengthened, or undergoes other changes which make it appear deformed; sometimes also the bones are depressed in certain places, or even fractured, and the fragments sunk in on the brain.

861. When the tumour of the hairy scalp is merely œdematous, it dissipates easily in a short time: it is sufficient to foment it with wine, with salt and water, or any vulnerary infusion. This tumour is more difficultly resolved when it is sanguine; and especially when the blood is extravasated under the *pericranium*, or under the teguments, and is there coagulated, as I have often seen: we are obliged to open this species of tumour. If the consequences of it are simple when the blood is only extravasated under the teguments, it is not so when these tumours are seated on the *cranium* itself, and the bones are found bare after the incision; which is the most usual case.

862. The people imagine that the accoucheur ought to press and mould the child's head, to restore it to its natural form, which it seems to have lost in delivery; and many ma-

trons are still of the same opinion. Though such pressure, methodically made, is no way dangerous to the child, yet I think it is better to proscribe it entirely; for the head soon recovers its natural form of itself. It is only when there is a fracture, with depression, that we need pay any attention to it; but then it is much less on account of the deformity of the head, than of the accidents which depend on the fracture and depression of the bones. This case requires the aid of a skilful surgeon, and not of a midwife.

863. After a preternatural and laborious labour, the accoucheur has sometimes a fracture or luxation to reduce; because he cannot always, notwithstanding the most exact precautions, free the child from those accidents: he ought therefore to examine it well before he leave it to the nurse.

864. The child may be born with some defects of conformation which require to be corrected instantly; because some may obstruct respiration, others suction, deglutition, or the ejection of the urine and excrements. Happy would it be if art were never at a loss on these accounts! The detail of all these things belongs more

more properly to a treatise on surgery, or on the diseases of children, than to one that professes to speak only of the operations which relate to midwifery.

S E C T I O N III.

Sequel of the Treatment of Healthy Children.

865. AFTER having attended to the pressing indications respecting the mother, having delivered the after-birth, and put her into a condition to pass a few seconds on the couch, the accoucheur must again attend to the child. He ought to preside at the dressing, in order to forbid every thing that may be hurtful; and should prescribe the method of managing the child in the first periods.

866. Almost all children are covered with a greasy viscous slime, which must be removed, not only for the sake of cleanliness, but also to facilitate the transpiration, which it greatly obstructs. It must be carefully cleansed from the arm-pits, the folds of the groins, and the parts of generation in girls, where this slime is more

abundant, and more apt to corrupt, and produce excoriations.

867. In order to cleanse the skin easily, and free it from this glutinous slime, we must begin by moistening it with a little oil or butter, to render it more fluid and less viscous; afterwards, it may be wiped off lightly with soft linen. If we do not first moisten it thus, being obliged to rub harder, we irritate and inflame the skin, so that it becomes, as it were, erysipelatous in those places. The child is afterwards to be washed with warm water, and a little wine; or it may be bathed, if thought proper: but we ought never, at this early period, to plunge it into cold water, because the effects of it might be very disagreeable.

S E C T I O N IV.

Of the Manner of dressing New-born Children.

868. EVERY nation has a different method of clothing and dressing a new-born child; but there cannot be any thing contrived more contrary to the intentions of nature, than the
drefs

dress so long since adopted among us, and unhappily too much known in most of our provinces.

869. Of all the parts which compose this dress, none appears more necessary than the little bandage which is put round the child's belly; whether to support the end of the cord till it fall off, or prevent an umbilical *hernia*, till the ring be sufficiently contracted to oppose it by itself.

870. At first, this bandage must be made of three compresses; that is to say, two of a few inches square, and another long enough to go round the body. In the middle of one of the former we make a hole large enough to receive the cord, and slit it downward from that hole, so that it may have two ends. We anoint this compress, near the hole, on both sides, with a little butter, that it may not stick to the *umbilicus*, nor to the cord; and that we may change it, when needful, without pulling and tearing the vessels, before the time of their perfect obliteration. This compress being placed on the belly, we pass the cord into the notch, turning it upward and towards the left side, and then cross the two ends underneath; so that the skin of the belly, which advances on the cord, may not appear,

appear, nor the *umbilicus* be stretched. We place the second compress over the first; and secure all with the third, with which we make a circular round the body, moderately tight.

871. Although the cord falls off by the fourth or fifth day, and the *umbilicus* is usually cicatrised by the eighth at farthest, it is very useful to continue this little bandage a few weeks longer. But the first compress may be made a little smaller and thicker, in order that the pressure may be made more exactly on the umbilical ring, and the proposed views be accomplished: but it must no longer be open in the middle as at first.

872. I have seen the cord fall off at the end of twenty-four hours; and the *umbilicus* as well cicatrised the second day, as it usually is after some weeks. Some authors have affirmed that children have been born with the *umbilicus* perfectly cicatrised: but we may be allowed to doubt of that, as well as of many other assertions, till we see it happen again. Though the cord sometimes dries, and falls off very early, at other times it does not happen till the eighth or tenth day; and the *umbilicus* is not well cicatrised for many months.

873. We cannot too long continue the use
of

of the little bandage, recommended at the latter end of par. 871, after the cord has fallen off. It is the only way to prevent an umbilical *hernia*, to which all children have a natural disposition, on account of the dilatation and weakness of the ring. This species of *hernia* is as often the effect of the negligence of nurses in not using this little bandage, as of a pre-disposing vice in the constitution. We must however allow that some children are born with an *exomphalos*; I have in my collection a *fœtus* of three months and an half with a very considerable one, relatively to the size of the body.

874. The child ought to be dressed as simply as possible, and wrapped up no more than the season and cleanliness require. The head ought to be covered only with a biggin and cap; the breast and arms with a little shirt, and waistcoat; the rest of the body, from the arm-pits to the feet, first with a linen cloth, and then with one of cotton or woollen, the surplus of which may be turned up before, and the whole secured with pins, and not with bands.

875. It is the interest of nurses to keep their children scrupulously clean. It is only by changing their clouts as soon as they are fouled, and by cleansing the breech and its environs
every

every time with warm water, for the application of which a sponge is extremely useful, that they can be preserved from those inflammations and excoriations, which keep them in continual pain, and disturb the nurses as much as the unhappy children.

876. The child is usually laid in a little basket or cradle, over which ribbands are crossed, to prevent it from falling out, when it becomes a little stronger.

877. The practice of rocking children is often very pernicious to them, on account of the derangements which those repeated concussions may produce in their feeble organization. Nurses would undoubtedly leave off this custom, notwithstanding the seeming advantage of it, if they could be convinced that the sleep they procure to their nurslings by this means, is rather a state of comatose stupor, than of quiet repose.

878. The choice of air proper for a newborn child, is not less important than that of its aliments, and other things which surround it. Its chamber ought to be in an airy situation, and not too close, that the air may preserve the necessary salubrity. It ought also to be as far as possible from noise, that the child may sleep quietly,

quietly, and not be waked with a start. It is not less essential that it should be laid opposite the light; which is the most effectual way to preserve it from squinting.

879. The child may do without nourishment the first day; but it is not proper to continue that severe regimen longer. In the mean time, it may be made to swallow from time to time a few spoonful of water, sweetened with sugar or honey, in order to dilute the *meconium*, and favour its evacuation. Many people also make them take oil of almonds and syrup of chicory, to the quantity of an ounce, with intent to purge them.

880. Gentle purgatives are very useful; but I prefer the syrup without the oil, with about twice its quantity of water, to render it more fluid. Oil of almonds is not so convenient, except the child be troubled with the colic. After having evacuated the *meconium*, we continue the use of the syrup, but in smaller doses, till that yellowness, which frequently appears on the skin in the first days, be entirely dissipated.

881. It is a pretty general opinion, that children suckled by their mother have less need of these aids than others; because the first milk, called *colostrum*, being more serous than any
that

that could be procured them, sufficiently fulfils the same indications. If this opinion were founded, it would perhaps be easy to give the same qualities to the milk of the nurse, by confining her to a proper regimen. But is it really because the milk is more ferous that it seems to purge the child at first? Or may that evacuation be provoked by other causes?

882. Supposing the milk to be more ferous in the first days than afterwards—which does not always happen, since we sometimes see it at that time loaded with a thick fat substance, and of a yellowish colour—could the child take enough of it to dilute the meconium, and solicit the intestinal canal to expel it? If the milk is more purgative at first than afterwards, it is only in proportion to the quantity of that fat part which it contains. It is not the quantity which the child sucks that purges it; for it often cannot extract a single drop. It is the efforts of suction which procure that advantage, by determining a greater quantity of saliva into the stomach, and making the cystic bile flow more abundantly into the *duodenum*; and the stimulating quality of the *meconium* itself, &c. Children who do not take the breast till very late, and who swallow no drink, evacuate like others, but

but not so completely as those who take the syrup of chicory ; and often on the fourth day, and even later, still discharge *meconium*.

883. It must however be agreed that no aliment is fitter for a child than its mother's milk. Though the breasts do not swell till the second or third day after delivery, we ought not thence to conclude that the milk does not begin to secrete in them before that epoch, or that the child has no need of nourishment till then ; as many have unfortunately imagined. The mother ought to give it the nipple as soon as possible ; but a nurse should not do it till later.

884. If it cannot have the mother's milk, that of another woman may be given. Although the milk of brute animals succeeds rather badly in this country, yet we are sometimes obliged to have recourse to it for a few days. We may then give cows milk diluted with a third of water, or barley water. Goats milk has been hitherto generally preferred, when particular circumstances have hindered a wet nurse from being employed ; either because it has been thought more analogous to the milk of a woman, or because a goat yields willingly to the suction of a child, and familiarises itself to it without any trouble. But the milk of these animals

animals does not succeed very well, whatever precautions we may take in its administration *.

885. It is not more advantageous to habituate a child to suck only at certain hours of the day, than to give it the breast every time it wakes or cries. It ought to be suckled when it is hungry; a little attention will enable the nurse to distinguish the cries excited by that sensation, from those caused by pain or other uneasiness.

886. The nurse should not suckle her child till some time after her meals, unless when we want to render her milk medicinal: she may then do it at a shorter interval. One who has fasted a long time, ought to swallow some light aliment a quarter of an hour before she gives the breast. She ought never to do it in a state of drunkenness, of violent passion, during the operation of a cathartic, or immediately after copulation.

887. Pap made with boiled flour, the use of which seems so generally adopted, is never less fit for a child, than in the earlier periods

* I have entered more fully into the diet of children, in a work published, by order of government, for country midwives: that may be consulted, from page 294 to 341 inclusively.

of its existence. It is justly looked upon as the most pernicious aliment which can then be given it: the great number of children who have had the strength to digest it, ought not to make us secure against its bad qualities. It may be rendered a little less viscid, and more easy of digestion, by first baking the flour with which it is prepared.

888. A light well-made panada is much better; but we ought not to begin to give it a child till after the fourth month and when the milk of the nurse is no longer sufficient. Afterwards the panada may be given it oftener, in order to prepare it for weaning.

889. Although it seems very conformable to the intentions of nature, not to wean a child till after the cutting of its first twenty teeth, it is generally done much sooner; but many have been very happy to return to the milk of a nurse at that time, because they were become so weakly during the cutting their last teeth, that they could digest no other food. They ought to be weaned as late as possible, if it be done before the eruption of all their milk teeth; and the time should be chosen when the mouth is least inflamed by them.

890. Of all the things which it is customary to prescribe to women to increase their milk when it diminishes, nothing succeeds better than that of a cow, either pure or mixed with barley water; notwithstanding the prejudices of the good women, who believe that milk drives away milk.

891. If the child should come into the world with any misconformation which prevents deglutition, it must be nourished by giving it little glysters of milk, several times a day, and by bathing it in the same fluid. The former have already succeeded in such cases. The example of adults, who have been nourished some time by glysters of broth, ought to have indicated this resource for children sooner.

SECTION V.

Of the Signs of a good Nurse.

892. IN the choice of a nurse we ought to attend both to the quantity and quality of the milk;

milk; and as it may be easily injured, it ought to be examined from time to time, in order to rectify it by a proper regimen. That of country women brought to town to suckle children at home, is particularly subject to this alteration; the change of air, of diet, and the want of exercise, are generally the causes of it.

893. The milk ought to be soft and sweet, of a good white, without odour, and of a middling consistence. As it easily contracts an odour from the vessel in which it is received, from the fingers that draw it, and as it preserves the taste and smell of certain aliments, and of some medicines, for several hours, in order to form a good judgment of it, the nurse ought to have fasted some time, to wash her fingers before she draws it, and receive it into a cup or glass perfectly clean. The accoucheur ought also to wash his mouth with water before he taste it.

894. The traces left by a drop of milk put on the nail, and suffered to run off gently, demonstrate its consistence. When it is too thick, it will scarcely run off; when too thin it leaves no more mark than water; whereas

that which is of a good consistence leaves a whitish mark behind.

895. Milk of three months old is commonly preferred to that of six ; but if the latter is less eligible, it is because being older, it is more likely to fail before the child be of an age to be weaned ; for otherwise it is often preferable to the former.

896. The idea which many people entertain, that a new-born child renews the milk of the nurse, has more than once been of dangerous consequence. The swelling which has come on during the first days of the experiment, may have occasioned this error ; but that swelling is delusive. It proceeds only from the substituted child's not being able, like the former, to empty the breasts of the nurse at each sucking, because it requires less nourishment. Leaving them half full, there soon arises a painful tumefaction, as on the third day after delivery ; the coagulated milk is decomposed in them, and if we make any efforts to extract it, we obtain nothing but a thin serum : this perhaps may have occasioned the prejudice in question.

897. A wet nurse ought to be of a middle
age,

age, of a good constitution, and exempt from all infection and disease. A brown woman is preferable to one that is fair, one moderately fleshy, to one very fat, or very lean; one with good teeth, to one who has them decayed, or has lost them; and, lastly, one who has breasts of a moderate size, streaked with bluish veins; with the areola a little elevated, the nipples well perforated, and of a convenient length. We ought also in the choice of a nurse, to have a regard to the qualities of the mind.

END OF THE FIRST VOLUME.

ERRATA in Vol. I.

Par. line.

26. 6. *for*, in their nature to ossify, which they always do, *read*,
in its nature to ossify, which it always does.
28. 6. *for*, interior, *read*, anterior.
57. 23. place a comma after assemblage.
59. 2. *for*, operate to, *read*, produce.
62. — in the note, *for*, vol. ii. *read*, vol. iii.
- 14. *for*, operate to, *read*, effect.
96. — in the note, *for*, vol. ii. *read*, vol. iii.
- — in the explanation of the fourth plate, A, A, *for*, antero-
postero, *read*, antero-posterior.
- — in the explanation of the sixth plate, *for*, M. Coutonli,
read, M. Coutouli.
296. 11. *for*, operate, *read*, effect.
284. 13. *for*, its, *read*, it.
316. 10. *for*, looked, *read*, looked upon.
338. 10. *for*, chid, *read*, child.
354. 5. place a comma after only.
440. 8. *for*, credited, *read*, accredited.
453. — in the note, *for*, litle, *read*, little.
512. 4 and 6. *for*, veinous, *read*, venous.
649. 10. *for*, developed, *read*, enveloped.
675. 8. *for*, protection, *read*, projection.
742. 9. *for*, of, *read*, to.
861. 9. *for*, we are obliged, *read*, we are sometimes obliged.

